

Information and Communication Technologies for Development (ICT4D) in Indonesia: Opportunities and Challenges

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List of Acronyms/Abbreviations

AusAID	Australian Agency for International Development
AFP	Agence France-Presse
AJI	Independent Journalists Alliance (<i>Aliansi Jurnalis Independen</i>)
APJII	Indonesian Internet Service Providers Association (<i>Asosiasi Penyelenggara Jasa Internet Indonesia</i>)
BAPPEDA	District Planning Agency (<i>Badan Perencanaan Pembangunan Daerah</i>)
BBPT	Indonesian Ministry of Research and Technology (<i>Badan Pengkajian dan Penerapan Teknologi</i>)
BKK	Vocational Center (<i>Balai Keterampilan Kerja</i>)
BMKG	National Meteorology and Geology Agency (<i>Badan Meteorologi Klimatologi Geologi</i>)
BNPB	National Disaster Management Agency (<i>Badan Nasional Penanggulangan Bencana</i>)
BPBD	Local Disaster Management Agency (<i>Badan Penanggulangan Bencana Daerah</i>)
BPR	Rural Bank (<i>Bank Perkreditan Rakyat</i>)
BPS	Indonesian Bureau of Statistics (<i>Badan Pusat Statistik</i>)
BRI	Indonesia People's Bank (<i>Bank Rakyat Indonesia</i>)
BRTI	Indonesian Telecommunications Regulation Agency (<i>Badan Regulasi Telekomunikasi Indonesia</i>)
BTS	Base Transceiver Station
CBO	Community Based Organization
CDMA	Code Division Multiple Access
CSR	Corporate Social Responsibility
DfID	United Kingdom Department for International Development
EDC	Electronic Data Capture
ENRAP	Electronic Networking for Rural Asia-Pacific
FGD	Focus Group Discussion
FORMASI	Civil Society Forum (<i>Forum Masyarakat Sipil</i>)
GDP	Gross Domestic Product
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
GSMA	Global System for Mobile Communications Association
ICT	Information and Communication Technologies
ICT4D	Information and Communication Technologies for Development
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFLS	Indonesian Family Life Survey
IM	Instant Message
IPB	Bogor Agricultural University (<i>Institut Pertanian Bogor</i>)
IPNU	Nahdlatul Ulama Muslim Organization (<i>Ikatan Pelajar Nahdlatul Ulama</i>)
IPNU-IPPNU	The Men's Student Association for the Nahdlatul Ulama Muslim Organization (<i>Ikatan Pelajar Nahdlatul Ulama- Ikatan Pelajar Putri Nahdlatul Ulama</i>)
ISP	Internet Service Provider

ITU	International Telecommunication Union
Jabodetabek	Jakarta, Bogor, Depok, Tangerang, Bekasi (Greater Jakarta Area)
J-PAL	Jameel Poverty Action Lab
KPC	Kaltim Prima Coal
M-Health	Mobile Health (using mobile phones)
MFI	Microfinance Institution
MMU	Mobile Money for the Unbanked
MNO	Mobile Network Operator
NakerTrans	Workforce and Transmigration Office (<i>Dinas Tenaga Kerja dan Transmigrasi</i>)
NGO	Non-Governmental Organization
OBGYN	Obstetrician-gynecologists
PIJAR	The Center of Information and Action Networks for Reform (<i>Pusat Informasi dan Jaringan Aksi untuk Reformasi</i>)
PJTKI	Indonesian International Migrant Worker Company (<i>Perusahaan Jasa Tenaga-Kerja Indonesia</i>)
PKK	Family Welfare Program (village women's group) (<i>Program Kesejahteraan Keluarga</i>)
PMI	Indonesian Red Cross (<i>Palang Merah Indonesia</i>)
POS	Point of Sale
PRD	People's Democratic Party (<i>Partai Rakyat Demokratik</i>)
PWKB	Karangadung Residents Unite (<i>Paguyuban Warga Karangadung Bersatu</i>)
RCT	Randomized Control Trial
RT	Neighborhood Unit (<i>Rukun Tetangga</i>)
RW	Designated Grouping of Neighborhood Units (<i>Rukun Warga</i>)
SAR	Search and Rescue
SDC	Swiss Agency for Development and Cooperation
SIM	Subscriber Identity Module
SIMKES	Health Management Information System (<i>Sistem Informasi Manajemen Kesehatan</i>)
SIRCA	Strengthening ICTD Research Capacity in Asia
SME	Small and Medium Enterprises
SMK	Vocational High School (<i>Sekolah Menengah Kejuruan</i>)
SMS	Short Message Service
TAF	The Asia Foundation
Tagana	Youth Disaster Preparedness (<i>Taruna Siaga Bencana</i>)
USAID	United States Agency for International Development
USSD	Unstructured Supplementary Service Data
WAP	Wireless Application Protocol

List of Indonesian Terms

Bupati	Elected District Head
Bahasa Indonesia	Indonesian Language
Jemput Bola	Pick-up service
Lebaran	Eid vacation
Karang Taruna	Youth Group (organized by local government)
Kartu Mencari Kerja	Looking for Work Card
Kecamatan	Sub-district
KerjaLokal	LocalWork (name of Grameen Foundation program)
Suara Merdeka	Local Newspaper Published in Central Java
Lowongan Pekerjaan	Job Opening
Pembantu	Housekeeper
Pengajian	Religious meeting/ Quran Recital meeting
PT Pos Indonesia	Indonesian National Post System
Pulsa	Credit (often implies airtime credit)
PulsaListrik	Electricity Credit
Travel	Shuttle Bus (privately owned)
UsahaKu	MyBusiness (name of Grameen Foundation program)
Warung	Stall (often implies food stall)
WarNet	Internet Café
Wayang	Puppet (traditional puppet show)

Executive Summary

About the Report

Information and Communication Technologies (ICTs) are now advancing quickly in emerging markets such as Indonesia. Between 80-95% of the Indonesian population already has access to mobile phones while Internet access, increasingly via mobile phones, is growing rapidly. In 2012, at least 20% of Indonesians had some form of Internet access—nearly half of who access Internet via mobile phones. The number of Indonesians online has doubled in the two years since 2010. As the uptake of mobile phones and mobile Internet has swiftly increased, so to has the use of social media. Facebook, in particular, has for many Indonesians *become* the Internet. There are nearly the same number of Facebook users as Internet users in Indonesia; and increasingly now for many new Internet users the first interaction with the Internet is through accessing Facebook applications already loaded onto even basic (non-smart) mobile phones.

At the same time, throughout emerging markets around the world in Africa, Latin America, and Asia, development practioners are increasingly focusing on how ICTs can be used for social and economic development purposes. Over the past decade, development organizations focusing on issues ranging from microfinance to disaster relief have increasingly begun to utilize mobile phones—and to a lesser extent, the Internet—to provide better access to services needed by marginalized and poor target groups. This study aims to provide an overview of the varied ways in which ICTs for development, or ICT4D, has taken root in Indonesia and to examine the opportunities and challenges that remain for ICT4D advocates as the variety and reach of ICTs continues to grow in Indonesia.

Objectives of the Study

The study attempts to answer the following questions:

- What are the current trends in ICT uptake in Indonesia and how is this relevant to the idea of ICT4D?
- How have ICTs been used for social purposes in Indonesia in the past?
- What types of organizations are utilizing ICT4D and what successes have they achieved? What challenges have they faced?
- How are rural-urban migrant workers in Kebumen district using ICTs to access needed information? What implications might this have for the larger Indonesian population?
- What are the challenges that ICT4D program initiators in Indonesia need to be aware of in order to develop successful ICT4D initiatives?
- What opportunities exist in the field of ICT4D in Indonesia that have yet to be taken advantage of?

Methodology

For this study, the existing literature and statistics regarding ICTs in Indonesia and the development of ICT4D and cyber activism were extensively reviewed. In addition, this study was largely built off of interviews with NGOs that have initiated ICT4D programs in Indonesia as well as off of a month

of fieldwork conducted by the author in Kebumen district, Central Java. The fieldwork in Kebumen consisted of interviews and focus group discussions (FGDs) with government officials, local NGOs, village government members, returned migrant workers, parents of migrant workers and youth looking for work. The fieldwork took place in the city of Kebumen, as well as three sample villages in the district, and also incorporated a survey of 15-30 year-olds in two of the villages.

Main Findings

1. On Past and Current Trends of ICT and ICT4D Uptake in Indonesia

Over 80% of the Indonesian population has access to mobile phones and according to *The Wall Street Journal* the market is nearly saturated. At the same time, telecommunications infrastructure remains largely focused on Java, Bali and urban hubs while signals in less densely populated and more remote areas of Indonesia remain weak or non-existent. The Internet has been used for social purposes since commercial Internet access became available in the late 1990s—assisting with the organization of political activists and thus indirectly contributing to the resignation of Suharto in 1998 after 31-years of authoritarian rule. While the Internet was initially accessed primarily through *WarNets* (Internet cafes), mobile Internet access is now taking off with nearly half of Internet access in Indonesia currently occurring via mobile phone. Similarly, the initial popularity of instant message (IM) programs has been largely replaced with the ubiquitous use of Facebook and other social media sites among Indonesian Internet users.

ICT4D advocates around the world have thus far largely focused on the use of mobile phones and argued that Internet is not an effective means of reaching the marginalized and poor since too few have Internet access. However, at least in Indonesia, this trend seems to be changing. Internet access has doubled from 10% to over 20% from 2010-2012 and will likely continue to grow rapidly as access to applications such as Facebook become increasingly available and affordable on even the cheapest mobile phone models. Many new Internet users, however, are likely to only, or primarily, access Facebook and thus may still have a limited understanding of the wider range of ways in which the Internet can be used.

Thus far, ICT4D programs in Indonesia have been initiated in areas such as mobile banking, disaster relief and alert systems, maternal health, the development of microfranchise models as income generation for the underemployed, and the provision of market commodity price information for farmers and job information for job seekers and employers. In each of these areas, with the exception of disaster relief and alert systems, mobile phones appear to be the only type of ICT being utilized. In the case of disaster relief and alert systems, however, the Internet and specifically social media tools such as Twitter have been used to improve the effectiveness of information sharing systems.

2. On the Successes of and Challenges Facing Current ICT4D Programs

Since most of the ICT4D programs in Indonesia are still quite new, measuring their success remains difficult. Perhaps even more significantly, few ICT4D programs have allocated funds for evaluation. An exception to this has been the Midwives Mobile Phone project in Banda Aceh, which was a rigorously

evaluated trial with a control group used such that the effects of the program could more clearly be discerned. Specifically a test group of midwives were given mobile phones and the control group was not. After a trial period, both groups of midwives were surveyed and it was found that those who had been given mobile phones were able to provide better service to patients, develop better relationships with both patients and doctors, and update patient records more efficiently (Chib 2010, Chib et. al. 2008). However, in this case, despite a predominantly positive evaluation, no clear steps for continuing the program seem to be in place.

One key challenge mentioned in the evaluation of the Midwives Mobile Phone program was sustainability—specifically how mobile phones and airtime credit could continue to be paid for. This was also a challenge identified for other ICT4D programs, such as those offering market commodity price information to farmers. In the case of the market commodity price information initiative, funding was initially provided through corporate social responsibility (CSR) programs. However, the NGO that developed the program, PUPUK, felt confident that the payment fees required of the farmers to continue the program would be affordable. Since the program has yet to shift from CSR to a stand-alone program, the sustainability of the program cannot yet be assessed.

Government regulations have also created a challenge for mobile banking and mobile job information applications. The government support that has enabled mobile banking to take off in countries such as Kenya does not as of yet exist in Indonesia. Regulations established by the Central Bank of Indonesia have made it impossible for users of mobile network operator (MNO)- based banking services to do cash out transactions through their mobile phones and MNO agents. Meanwhile, other Central Bank regulations have also limited the ability of rural banks to initiate remittance services via mobile point of sale (POS) devices. Though the Central Bank has created e-money regulations that were meant to allow payments to be done via mobile phone, initial licensing requirements and overall confusion over these regulations continue to inhibit the success of mobile banking in Indonesia. Organizations such as Mercy Corps have found ways around the regulations by using a commercial bank, Bank Andara, as an intermediary that can provide mobile banking services on behalf of microfinance institutions (MFIs). However, reaching scale remains difficult.

Another type of ICT4D program facing challenges in the form of government regulations is the job information program developed by Grameen Foundation AppLab Indonesia. MNOs have recently become embroiled in legal troubles resulting from suspect premium Short Message Service (SMS) practices that left customers feeling they were unable to unregister and that they had been charged for services unfairly. As such, developing services that provide job information through SMS in the current regulation climate has become particularly difficult.

The government regulation barriers faced by mobile banking and job information applications ties into another major challenge for both these programs on the user side—trust. When dealing with financial transactions and job information, Indonesians tend to be suspicious of mobile phone enabled transactions, particularly when these transactions do not involve already established social networks. In one case, after a rural bank in Bali had difficulty getting customers to conduct transactions remotely via

mobile phones, local agents with whom the customers already had established relationships with were sent to show how the mobile payment system worked.

In the area of disaster relief, ICT4D programs have seen some initial success. However, the extent to which this success has been effectively replicated and further used for disaster alert systems is still unclear. In the cases of the 2004 tsunami in Aceh and the 2010 eruption of Mt. Merapi, ICTs have proven to provide useful services in assisting survivors of the natural disasters. The Midwives Mobile Phone program is an example of an effective ICT response to the 2004 tsunami in Aceh, which had left health resources precariously low in the region. The NGO Air Putih Foundation also successfully re-established Internet networks in the area in a timely manner, which in turn provided critical assistance to the wide variety of NGOs working on the relief effort in the area.

In response to the 2010 eruption of Mt. Merapi, Jalin Merapi utilized an already established following on Twitter and a wider range of ICTs including a website, Facebook page, SMS-text messaging via mobile phones and messages relayed via two-way handheld receivers to ensure that information was efficiently transmitted between survivors and volunteers. As a result of their efforts, water and food needed by the survivors was quickly acquired and disbursed (Nugroho 2011). At the Kebumen Local Disaster Management Agency (BPBD) however, a computer system provided by the Indonesian government to relay disaster alerts directly to registered mobile phone numbers remains largely underutilized. The only numbers registered in the system belonged to the BPBD officers. According to the officers in charge, bureaucracy and concerns about trust are at fault for the fact that the system has not been optimally put to use.

3. On the Use of ICTs by Rural-Urban Migrants in Kebumen District

According to 2010 data collected by the Indonesian Statistics Bureau (BPS), 64% of Kebumen district residents had a mobile phone and 8% had access to Internet—close to the national average at the time. Among the 8% with Internet access, the main methods of accessing the Internet were via *WarNet* (54%), at school (40%), and via mobile phone (39%). Since *WarNet* are mostly only found in villages large enough to have junior high schools and/or high schools, it seems likely that many *WarNet* users were students coming from other villages. Not surprisingly, among Kebumen district's Internet users, 59% were between the ages of 13-19.

The district of Kebumen in Central Java is particularly well known for producing many migrant workers—most of whom work as *pembantu* (house keepers), construction workers, or factory workers in big Indonesian cities such as Bandung and Jakarta or abroad in wealthier countries such as Malaysia and Singapore. In earlier times, out migration from Kebumen district villages had been discouraged by village members because of the perceived loss of community ties. Now, however, in villages where job opportunities are low, the vast majority of youth leave the villages in search of work after graduating junior high or high school.

One reason why migration is now generally accepted within rural Kebumen communities may be the ability of families to keep in better touch through affordable mobile phones. Mothers of migrant workers who do not themselves own mobile phones often borrow mobile phones from their neighbors and pay for the airtime. Some villagers have even begun to use Facebook on their mobile phones to message their friends in foreign countries—a cheaper alternative to paying international text message rates.

As for the job seekers themselves, information about jobs outside of the villages has traditionally been acquired through family members or friends who are already working as migrant workers. The increasingly commonplace use of mobile phones, however, has made asking and receiving information about job opportunities much easier and more efficient. Moreover, young people are increasingly using Facebook to bring existing community networks online. Some high school students now ask about information on job openings through high school alumni Facebook groups/ pages.

One village has even created a private Facebook group for all village members living within and outside of the village. The group currently has 210 members and the Facebook group administrator verifies that each Facebook account requesting admission belongs to a member of the village before providing him or her with access to the Facebook group. Through this Facebook group village members living in Bandung or Jakarta, or even abroad in countries such as Malaysia, are able to connect with each other and arrange local social gatherings. Members of the Facebook group also pool monetary donations to assist in local development projects in their home village—such as the caring of orphans or the rebuilding of a mosque. On at least one occasion, the Facebook group was even successfully used by a villager to ask and receive information about job opportunities outside of the village.

Though the use of mobile phones to contact family members and friends is still far more commonplace than the use of the Internet to look for job opportunities, a number of cases show that interest in better utilizing the Internet exists. In at least one case, a junior high graduate from one of the Kebumen villages used Google to find a job at a *warung* (food stall) in Bandung when she had no existing social network there. Others have even tried to use Facebook as a search engine, typing in “*lowongan pekerjaan*” (job opening) in the search bar in the hope that their Facebook friends may have posted useful information.

Existing networks of family and friends remain by far the most trusted and utilized sources of information for rural-urban migrant job seekers. However, mobile phones, and even the Internet, are increasingly playing a more significant role in how job information is shared among young people. Technology gaps still exist however between the younger and older generations, and between wealthier and poorer villages. These technology gaps in turn largely determine who is making use of ICTs and who is not. Just as major shifts have occurred in ICT access and usage among Kebumen villagers over the past two years, however, the increasing affordability of ICTs will likely lead to a much larger number of new users every year.

4. On Future Opportunities and Challenges for ICT4D in Indonesia

The following four steps are suggested as a means by which development practioners can adequately address challenges facing the success of ICT4D programs in Indonesia while also making use of the latest opportunities.

I. Incorporate Trust and Community Networks into ICT4D Tools

In all cases where ICT4D programs have succeeded in Indonesia, trust has been a factor and local networks have been utilized. The extent to which residents of Kebumen district use mobile phones and the Internet to build off of established social networks and their wariness towards responding to information that comes from outside of such networks reinforces the notion that trust and community are vital for the success of ICT4D.

II. Understand which development areas are best suited for ICT4D

The initiatives that utilize ICTs for efficiently sharing information, utilize trust and local networks, and do not rely on government regulations have thus far shown to be the most successful in Indonesia. Not all development issues are necessarily well suited for utilizing ICTs as a means for transmitting services to targeted benefactors/ clients.

III. Follow ICT Trends and Utilize Social Media when Targeting Youth

While most ICT4D programs have focused on mobile phones, the Internet—specifically mobile Internet—is quickly becoming more relevant. Particularly amongst junior high and high school aged youth, social media may become the most effective means for sharing information. At the moment, however, most of the older generations of the rural poor continue to have no access or understanding of how to use the Internet. Trends in who is using the Internet and to what extent, however, are likely to change rapidly as ICTs develop. Though the lack of widespread telecommunication infrastructure remains a barrier.

IV. Use ICTs as Tools vs. Solutions for Addressing Development Issues

Regardless of the success of past ICT4D initiatives and the rapid growth in ICT development throughout Indonesia, ICTs remain a tool for addressing development issues rather than a solution in itself. Not all of the consequences of ICT growth in Indonesia are necessarily positive—school aged children may now spend more time playing games on their phones than paying attention in class, for example. However, if used correctly, ICTs may be able to make the sharing of productive information more efficient and affordable within already developed networks.

I. Introduction

As mobile phone access and usage continues to increase rapidly in Indonesia, more opportunities arise to use this affordable technology to serve social and economic development goals. Thus far, international NGOs such as Mercy Corps, World Vision and the Grameen Foundation have implemented development programs that make use of mobile phones to provide mobile banking services, enhance maternal health services, create small business models for entrepreneurs, and produce a service that provides job information to informal job seekers. Local NGOs, such as Jalin Merapi, Air Putih Foundation, and PUPUK Bandung, have also used both mobile phones and the Internet to enhance disaster alert and relief programs as well as to create an easily accessible and up to date database on commodity market prices for farmers. The Government of Indonesia, too, has played a role in these programs by creating relevant open source software and developing disaster alert systems that are capable of sending mass text message alerts to registered mobile phone numbers.

All of these initiatives, however, are fairly new and as a result little has been written about them and evaluations of their effectiveness have been

scarce. Moreover, while research papers have been written on whether the use of mobile phones has improved the lives of the poor and marginalized groups in other developing countries, this is an area that appears to remain under-researched in Indonesia. As such, NGOs and other agencies interested in developing mobile phone enabled applications would likely benefit from a better understanding of how target beneficiaries (generally the poor and marginalized groups) are currently making use of mobile phones and existing ICT4D programs.

Over the past decade, mobile phones have increasingly been used to assist in addressing a variety of social and economic issues in developing countries around the world. Thus far, however, the Internet and social media have largely been seen as tools to be used solely by program administrators since they are seen as less accessible (more expensive) services. The recent increase in affordable Internet access through mobile phones over the past couple of years, however, has now led to a much higher uptake of social media services even in rural areas of Indonesia. As such, another area in need of more research is how the Internet and particularly social media can be better utilized as development tools on the ground. Together,



mobile phones and Internet services are known as Information and Communication Technologies (ICTs) and the use of these for development programs have come to be known as ICTD or ICT4D (ICTs for Development).

This paper, in addition to outlining a variety of ICT4D programs that have been initiated in Indonesia, will use primary research conducted with migrant worker communities in the district of Kebumen, Central Java, to better understand how these communities utilize mobile phones and the Internet to access job information. The main questions being asked therefore are as follows: How have modern Information and Communication Technologies (ICTs) been used thus far in Indonesia as a means of facilitating social and economic development and activism? To what extent have residents, and particularly rural-urban migrant workers, from the district of Kebumen utilized ICTs to access information? In particular, have ICTs been used by those looking for work to help them access job information? What might the findings from the research in Kebumen and from the other ICT4D (ICTs for Development) case studies imply about the opportunities and limitations that exist for ongoing ICT-enabled development projects and the concept of “ICT4D” in general in Indonesia?

Four arguments will be made in particular. The first is that NGOs and other interested actors should take into account how Indonesians use mobile phones and Indonesian ideas about trust before initiating ICT4D services. As such, in order for ICT4D services to be successful, they must take into account local needs and should utilize field staff and local partners that are known in the communities. Local partners may range from local community members operating neighborhood warungs (food stalls) to local agents at rural banks (BPR) or local NGOs working within the community at hand. The second argument is

that certain ICT4D services, such as information provision, are more likely to be successful than others, such as mobile banking, which have significant regulation barriers to face and which inherently involve significant issues of trust. The third is that the power of social media should be considered as a potential ICT4D medium now that more and more young Indonesians are using Facebook through their mobile phones. Lastly, development practitioners must not forget that ICT tools in themselves are not solutions to development issues, but rather a potentially useful method for facilitating development programs and increasing access to services more efficiently.

This paper will begin with an explanation of the methodology used for this research and its limitations, followed by an overview of ICT growth and usage in Indonesia, including the concept of ICT4D and cyber activism. The paper will then continue by providing in depth profiles of ICT4D usages in five different development sectors, namely: mobile banking, disaster relief and alert systems, maternal health, agriculture (market commodity price information for farmers), and job information and creation. Following this, an overview of labor trends in Indonesia will be provided, which will then lead into a description of the research area, Kebumen, including the district's migration, employment and ICT usage trends. The next section will then provide findings about ICT usage in migrant communities from the fieldwork conducted by the author in the three sample villages: Langse, Karanggadung and Pasir. After the relevant findings have been shared, the paper will provide an explanation of the major implications for ICT4D in Indonesia arising from the case studies on ICT4D use throughout Indonesia and the use of ICTs by migrant worker communities in Kebumen. The paper concludes with a review of the paper's main arguments before briefly touching on possible areas for further research.

II.

Methodology & Limitations

In conducting research for this paper, literature and statistics on the subjects of ICT usage in Indonesia, ICT usages for development as a new trend in development work, and the current state of labor in Indonesia were all reviewed. Additionally, six in-depth interviews were conducted with development practitioners working at NGOs and government agencies in Indonesia that had initiated ICT4D programs. Following these interviews, the author collected data from the Indonesian Bureau of Statistics (BPS) and the Indonesia Family Life Survey (IFLS). The author then conducted fieldwork in Kebumen, Central Java, for one month to gain a local perspective on the usage of ICTs in rural underprivileged communities. This fieldwork included data collection from the local NGO FORMASI and the local government agency in charge of workforce programs, *NakerTrans*. In addition to this data collection, the author conducted 14 interviews with FORMASI, local government agencies, village heads, migrant workers and other relevant individuals. Aside from these interviews, nine Focus Group Discussions (FGDs) were also conducted in the three sample villages with *Pengajian* groups (Quran study groups), village government members, villagers who have worked outside of the villages in the past, and villagers currently looking for work. A

survey was also conducted in two of the villages using the mobile phone-enabled survey application, EpiSurveyor, with a total of 82 respondents.

While this research has led to some very interesting findings, the limitations of the scope of the research must also be taken into account. The case studies profiled from different parts of Indonesia were found by previously being mentioned in published articles or through connections between other NGOs and AKATIGA Center for Social Analysis. As such, it is quite possible that other ICT enabled programs have been initiated in Indonesia, which are not yet known to the author.

As for the fieldwork in Kebumen, limited time and resources meant that samples were small and while attempts were made to make them representative, the extent to which they were in fact representative of migrant worker communities in rural Kebumen is uncertain. Data collected in Kebumen was done with the help of local NGO FORMASI and village governments. Since FORMASI chose the villages to work in and the village governments chose the FGD members and found the survey respondents, these samples and the resulting information may be biased



towards the people that FORMASI and the village governments are most closely connected to. Additionally, it appeared that village governments had skewed views of the resources available to the average villager and between members of different age groups and genders different estimates were expressed for ICT usage and the prevalence of migration for jobs. Moreover, the research in Kebumen was largely based on the perspectives of parents of migrant workers and returned migrant workers. Since current migrant workers were not in the villages they were not directly interviewed. It is possible that those who have not returned to the village have different perspectives about migrant work and ICT-usage.

Moreover, it is difficult to generalize the largely anecdotal evidence found in the sample villages in Kebumen to the rest of the district, and even more difficult to generalize these findings for the rest of Indonesia. Lastly, ICT4D is a rapidly changing and developing concept because new technologies are constantly being produced and are more rapidly reaching more remote areas. For example, mobile phone access this year in Kebumen seems to be much higher than last year, and trends in ICT adoption will likely keep moving forward at an increasingly rapid pace. As such, information collected this year on ICT usage in Kebumen, and Indonesia generally, will likely experience significant change over the next few years.

III.

ICTs for Development

3.1. What are ICTs?

For the purpose of this paper, Information Communication Technologies (ICTs) refers to the mobile phone and Internet, including all related applications such as E-mail and social media (Facebook, Twitter, etc.). ICTs also often refer to personal computers (PCs) and sometimes even to older technologies such as television and radio. (SDC Working Paper 2011, 8). However these latter technologies will largely be left out of the scope of this study.

3.2. The Mobile Phones and Social Media Boom in Indonesia

In 2001, there were less than 10 mobile phone lines for every 100 people living in developing countries. In the past decade, however, cheaper mobile phones have rapidly become more widespread and accessible. Meanwhile, mobile growth in developed countries slowed down as the market for mobile phones neared saturation. By 2011, according to ITU estimates, there were nearly 80 mobile phone lines for every 100 people living in developing countries (ITU 2012).

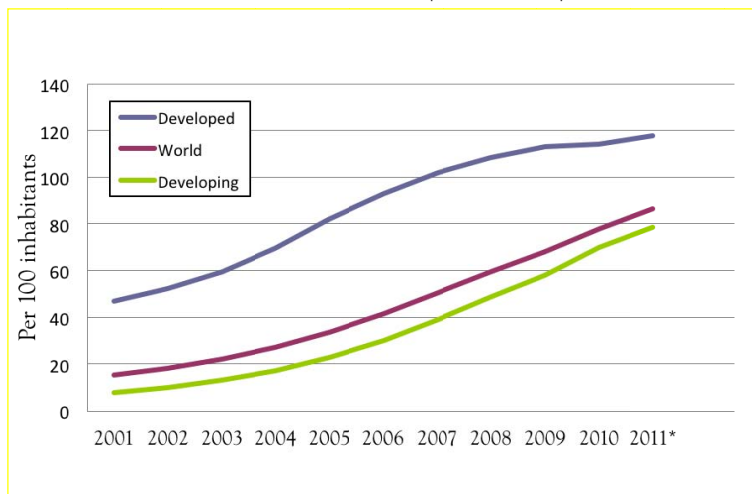
Over the past couple of decades, the use of mobile phones by Indonesians has rapidly increased

in both rural and urban areas. In 2010, Indonesia had surpassed the average for developing countries with 91.72 mobile subscribers for every 100 people in Indonesia—up from 67.08 in 2009 and 59.83 in 2008 (ITU 2012). Since users in Indonesia often have more than one phone number while using a variety of different operators, this data should not be interpreted as implying that 92% of the Indonesian population has a mobile phone. However, *The Wall Street Journal* in August 2011 noted that Indonesia's mobile phone market has become saturated as indicated by the fact that "cell phone usage penetration is approaching 80%." Two months later, Nielsen published a report that found mobile phone ownership to have reached 91% among consumers aged 15 and older. Moreover, 38% of these same consumers owned smartphones and another 29% expressed their intention to acquire smartphones (Nielsen 2011). As of 2011, Indonesia had over 3 million Black Berry users—making the country account for about 6% of the entire BlackBerry user base worldwide (Kevin 2011).

In Indonesia, 78% of households own an internet-enabled mobile phone. In contrast, only 31% of these households own a desktop computer and only 29% own a laptop or netbook. As such, it



Table 1: Mobile Phones per 100 People



(Source: ITU 2011, *numbers recorded for 2011 represent estimates)

appears that mobile phones have rapidly become a predominant means for accessing Internet (aside from accessing internet through internet cafes, schools and offices). Among digital consumers in Indonesia, 43% indicated that the mobile phone was their single, main device for Internet access. At the same time, Indonesia has the lowest Internet penetration rate of South East Asia with 21% of consumers over the age of 15 using the Internet as opposed to 67% in Singapore and 56% in Vietnam (Nielsen 2011).

Indonesia is also the exception in South East Asia when it comes to how the Internet is most often used. While the most popular Internet activity is e-mail in Malaysia, the Philippines, and Thailand, social network usage far outweighs e-mail activity in Indonesia. As of June 2012, Indonesia had the 5th largest market for Twitter—and the country's capital, Jakarta, had the most Twitter users of any city in the world (Semiocast 2012). Notably, in January 2011, the majority of the 22.7 million tweets generated in Indonesia were found to come from mobile gadgets (SalingSilang 2011).

Today Indonesia is also Facebook's third

largest market¹, with 90% of digital consumers in the 4th largest country in the world using the social media site (Nielsen 2011). As the headline for an article written in the Agence France-Presse in February 2012 aptly put it, "For many Indonesians, 'Fesbuk' is the only Internet." As the article explains, Facebook now often comes as part of a bundle of applications pre-installed in even the cheaper mobile phone models in Indonesia. As such, a large portion of Indonesian Facebook users have never

accessed the Internet through more traditional methods such as desktop computers or laptops. As a result, Indonesians who have not previously used the Internet prior to accessing Facebook through their phones are not always aware that they are using the Internet when they use the social media application. According to Nielsen, social networking accounts for 82% of online activities taking place in Indonesia. Most of the remaining online activities are related to education, jobs or buying products (Nielsen 2012).

The APJII (Indonesian Internet Service Providers Association) states that there were 31 million Internet users in Indonesia in 2010, while the Ministry of Communications and Information Technology reported in June 2010 that the number of Internet users had reached 45 million in Indonesia, having grown by 50% since 2009 (Suryadhi 2010, Media Indonesia 2011). According to the later statistic, Internet access had reached approximately 18.5% in Indonesia by June 2010. However, the 2010 Indonesian Census conducted by BPS (the Indonesian Statistic Bureau) showed similar numbers to APJII, which placed Internet usage at below 10% of the country's population.

1 Indonesia was Facebook's second largest market in 2010 but has since been surpassed by India (Nugroho 2011).

Table 2: Top 5 activities conducted on a weekly basis by digital consumers 15+

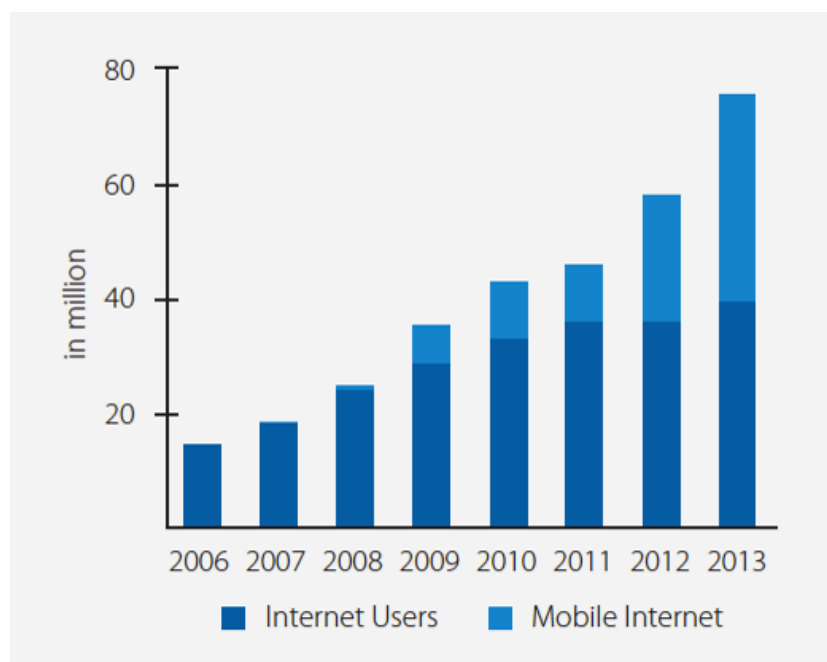
Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Private messages on social network sites 71%	Email 92%	Email 90%	Email 96%	Email 85%	News 90%
Public comments on social network sites 61%	Private messages on social network sites 83%	Private messages on social network sites 83%	News 86%	News 79%	Search 81%
Browsing people's profiles 59%	News 82%	Wall posts/ status updates/ group messages via social network sites 81%	Search 81%	Private messages via social network sites 74%	IM 68%
Updating social network profile 56%	Search 79%	News 79%	IM 70%	Reading comments about brands/ products 70%	Gaming online 52%
Email 51%	IM 75%	IM 78%	Private messages on social network sites 67%	Sharing content 69%	Streaming audio 47%
Source: Nielsen 2011, shading added for emphasis by the author.					

The latest data from the ITU, on the other hand, provides a prediction that Internet usage in 2011 would be 18%. At the same time, the ITU uses Ministry of Communication and Information Technology data to show that slightly less than 11% of the Indonesian population had access to Internet in 2010. This seems to indicate that APJII, BPS, ITU and the Ministry of Communication and Information Technology may not have the necessary resources to provide the most up to date data and that communication between these bodies may not always be direct and clear. Merlyna

Lim also notes that the world has yet to agree upon a uniform set of information society access indicators and that data can be unreliable and is often difficult to locate and compile in developing countries such as Indonesia (2011, 28).

Facebook, on the other hand, knows exactly how many users they have on a daily basis. On October 1, 2012, there were 47,539,220 Facebook users in Indonesia—in other words, 19.57% of the country's population is on Facebook (SocialBakers 2012). This means, that currently at least 20% of

Figure 1: Mobile vs. Non-Mobile Internet Users in Indonesia



(Source: Graph by MarkPlus 2011; data from Mobile Money 2010)

the country's population must have at least some access to Internet. According to MarkPlus, 22% of Indonesia's population had Internet access in December 2011. Nielsen published similar information stating that 21% of the population had Internet access in October 2011. Nielsen also found that 90% of all digital consumers aged 15+ in Indonesia maintained an active Facebook profile (Nielsen 2011). It seems that Internet access in Indonesia is now expanding rapidly and that the vast majority of these users are accessing Facebook.

The growth in Internet usage as well as Facebook usage can largely be attributed to the growing ability to access Facebook via mobile phones (Mobile Monday 2010 referenced by MarkPlus 2011, Guharoy & Morgan 2012). If these trends in growing mobile Internet access continue, half of all Internet access in Indonesia will likely be through mobile phones by 2013. (See graph produced by MarkPlus in Figure 1).

According to Nielsen, the portion of Indonesian Internet users that are utilizing mobile Internet may have already hit the half way mark—having reached 43% of Internet users in 2011 (Nielsen 2011). Either way, mobile Internet has clearly developed rapidly over the last few years.

Facebook in particular is making use of the mobile phone boom by tailoring versions of Facebook to different types of phones such that mobile Facebook access is not limited to smart phone users. As of 2010, an estimated 16.7% of Indonesians had Smart

Phones (MarkPlus). However, Wireless Application Protocol (WAP) enabled feature phones with only limited browser capabilities and no applications can still access a text-only version of Facebook for free, called "Facebook Zero" (Mims 2012). Since most existing mobile phones are WAP-enabled (non-smartphones), this allows Facebook access to spread far more widely. As an online advert

Figure 2: Facebook Zero advertisement

Sponsored
Create an Ad

0.facebook.com

0.facebook

Kunjungi
0.facebook.com
 untuk menikmati
 gratis akses
 Facebook Mobile.
 Untuk pelanggan
 AXIS, Telkomsel,
 Three, Indosat, dan
 XL.

(Source: Facebook.com)

Figure 3: Types of Mobile Facebook Access



(Source: Quartz.com)

in Bahasa Indonesia shows, Facebook Zero can be accessed for free at 0.facebook.com by those using one of a number of major Indonesian mobile carriers through which the service is enabled (Figure 2). The text of the advertisement (which likely appears only to Facebook users in Indonesia) translates as “Visit 0.facebook.com to enjoy free Facebook Mobile access. For AKIS, Telkomsel, Three, Indosat, and XL customers.” What this advertisement does not mention is that standard browsing rates apply when the customer views photos or clicks on external links.

When Facebook Zero was launched in May 2010, it initially signed up 50 mobile carriers in 45 countries. According to Christopher Mims, the majority of Facebook users in emerging markets such as Indonesia can only access Facebook (and thus Internet) through Facebook Zero on their feature mobile phones since they cannot afford other means of accessing the Internet (2012). The extent to which this possibility is being taken into consideration by various agencies compiling data on Internet usage in Indonesia is unclear. Moreover, Facebook Zero is only one of a variety

of forms that Facebook takes on mobile phones in emerging markets throughout Asia, Africa and Latin America.

In 2011, for example, Gemalto released an even simpler Facebook software application that can be accessed by even the most basic of mobile phones without a data plan, utilizing only SMS capabilities—"Facebook for SIM." The service, which embeds Facebook directly onto SIM cards, launched first in Argentina but has the potential to be used by any of the billion-plus GSM (Global System for Mobile Communications) handset users throughout the developing world (Mims 2012, Tofel 2011). Another service, Fonetwish, claims to be able to provide access to Facebook to any mobile phone by utilizing USSD (Unstructured Supplementary Service Data). The service can be accessed anywhere simply by dialing *325#, even on mobile phones without any Internet or data plan (Mims 2012, Fonetwish.com). Software applications such as Facebook Zero, Facebook for SIM and Fonetwish, therefore, seem likely to contribute significantly to the rapid uptake of mobile Internet in Indonesia.

While technological innovations have been central to the growth of Facebook usage in Indonesia, arguably the success of social media in Indonesia can also be attributed to two main factors: the affordability of mobile phones and the strong sense of community that is already embedded in Indonesian culture. A third factor may also be the perceived trendiness of social media and a consumer culture that has come to highly value the newest technological innovations through which such trends spread (Nugroho 2011).

3.3. #ICT4D and Cyber Activism

As the development of Information and Communication Technologies (ICTs) have

rapidly expanded and diversified over the past decade, the potential to use these technologies has increasingly been utilized in international development strategies and programs. The use of ICTs for development, often abbreviated as ICT4D or ICTD, has in recent years become a trending topic of its own. The rapid expansion of mobile phone access in poor countries and often even in relatively remote areas—in conjunction with highly publicized success stories such as that of mobile banking application M-PESA in Kenya—have led to businesses, international NGOs, multilateral agencies and donors all eagerly racing to utilize these advancements in affordable technology to expand their reach with target clients and new customers. Businesses, particularly Mobile Network Operators (MNOs) but also financial institutions, have also taken keen interest in new markets in developing countries. Between 1995 and 2002, \$210 billion was invested in telecommunication infrastructure in developing countries by the private sector (Bhavnani 2008, 8). In some cases, private companies have also partnered with non-profit organizations to develop mobile phone applications that target the needs of the poor. The M-PESA product, which enables cash withdrawals, deposits, and transfers to be made via mobile phone, was developed through a partnership between Kenya's Equity Bank and the country's largest MNO, Vodaphone. However, the pilot program initially received funding support from the United Kingdom's Department of International Development (DfID) in 2003.

Within the non-profit sector, the Bill and Melinda Gates Foundation in 2009 provided a US \$12.5 million grant to establish a Mobile Money for the Unbanked (MMU) program in partnership with GSMA (Global System for Mobile Communications Association) and in 2010 also established a US \$10 million fund in partnership with USAID (United States Agency for International Development)

to incentivize mobile money services in Haiti. The World Bank also has an Information and Communication Technologies unit, a blog dedicated to “Information and Communications for Development (IC4D)” and a series of reports dedicated to IC4D. Meanwhile the Grameen Foundation has created “App Labs” in Uganda, Ghana, Indonesia and Colombia alongside their more traditional programs in order to develop and deploy mobile phone based solutions to alleviate poverty. The International Development Research Centre (IDRC) and International Fund for Agricultural Development (IFAD) partnered up in 1998 to create ENRAP (Electronic Networking for Rural Asia-Pacific) to share knowledge resulting from innovative projects, particularly those utilizing ICTs, between various countries in the Asia-Pacific. Research institutions are also focusing on the application of ICTs for addressing the Millennium Development Goals. For example, in Singapore, the Strengthening ICTD Research Capacity in Asia (SIRCA) program was recently established with this goal. The Jameel Poverty Action Lab (J-PAL), a network of professors utilizing randomized control trials (RCTs) to evaluate development policies, is also currently using RCTs to assess the effectiveness of a mobile phone based platform for delivering agricultural information to farmers in India.

The means by which ICTs bring value to the field of development—particularly in rural areas—comes mainly in the form of providing relatively affordable and accessible information and knowledge services, as a means of two-way communication, and as a means of transport (Bhavnani 2008, SDC 2011). Through mobile phones (internet-enabled or not), knowledge, ideas and even money can now be transferred between two or more people, often at prices that are much lower than alternatives and at faster speeds. Areas for which mobile phones have been used for development

programs thus far include: disaster relief, education and health information dissemination, financial transactions (including remittances, savings, and insurance), market commodity price alerts, and job information. Though generally not a direct result of a development program, mobile phones can and have also been used to increase social capital and social cohesion (Bhavnani 2008) and for promoting social activism (Lim, Nugroho, and others). In some cases, ICTs have also been used to track government financial transactions in order to ensure or promote greater transparency.

On the whole, at least until very recently, the data has shown that while mobile phones are becoming more accessible for the poor in countries around the world, the technology gap for Internet access between the developed countries and the developing countries remains high and Internet access remains relatively costly for most. As a result, the general consensus among NGOs that have focused on the use of ICT4D has been that while mobile phones seem to carry much unlocked potential to provide information access, services and income-making opportunities to both the urban and rural poor, the Internet seems less likely to be an appropriate tool for furthering development aims. The Swiss Agency for Development and Cooperation (SDC) in explaining why Internet is mainly not suitable for the poor, recently wrote that “as internet access is costly and requires a fair degree of (mostly English) literacy and information competencies, the Internet is mostly used by the affluent political elite, donors and staff of modern NGOs” (SDC 2011). As this paper will argue, however, the Internet—or at least social media—will likely become a more significant and useable tool within ICT4D as internet access becomes cheaper and easier through mobile phones in developing countries. Moreover, user friendly social media sites like Facebook that are translated into a wide range of languages are now



beginning to break the English literacy barrier to information access.

Access to Internet, and particularly social media, as noted above, is expanding rapidly in Indonesia. Though it appears that development organizations have yet to capitalize on this trend, social activists have been utilizing the Internet and specifically social media for cyber activism. This form of activism has gained wide attention from the use of social media in the organization of protests against—and ultimately the overthrow of—authoritarian governments in Tunisia and Egypt. However, in recent years in Indonesia the Internet has largely been used by community based organizations instead for less radical civil society development. Prominent Indonesian scholars who have written on this subject include Merlyna Lim and Yanuar Nugroho.

The earliest forms of Internet arrived in Indonesia around 1986 and were initially limited largely to local network connections for universities, research institutions and a few government agencies. However, commercial Internet Service Providers (ISPs) and global Internet access arrived in Indonesia shortly before the Asian economic crisis hit the country in 1997 (Lim 2002, 88-89). The development of the Internet therefore, also coincided with the demise of the 31-year authoritarian leadership under General Suharto. While public space and civil society activities had been highly controlled and managed by the Suharto administration, *WarNet* (internet cafes) that began to open up as the economy dived, provided new means for Indonesians to interact with each other more openly. Initially Suharto attempted to control Internet access with early ISPs such as Indonet being controlled by state-owned companies but eventually these attempts failed with the economy (Lim 2006, 7).

After decades of state controlled information,

WarNet now provided Indonesians with a channel for civic discourse. The earliest underground political activist groups, the Center of Information and Action Networks for Reform (PIJAR) and the People's Democratic Party (PRD), made use of the Internet to communicate with followers and share information and ideas prohibited under the authoritarian rule. Twenty-three years before the Arab Spring, the Internet was already being used to help create a collective identity and build a movement that eventually led to the overthrow of a dictator in Indonesia in 1998 (Lim 2006, 10-11).

From the beginning, the most used feature of the Internet at *WarNet* in Indonesia was instant message chatting (Lim 2006, 9). Today, community based organizations (CBOs) tend to make most use of mailing lists, email, websites and to a lesser extent blogs. A survey of 234 Indonesian CBOs conducted in 2010 found that a large majority now also use Facebook and utilize text messages as a means of communication and providing information. Among survey respondents, the main benefit to society that resulted from the CBOs' use of the Internet and social media was the provision of a wider perspective and deeper understanding on certain issues. Slightly less than half of the CBOs believed that they were sharing knowledge and skills in using software/ applications/ Internet, etc. and a quarter believed that they provided wider society with an increased capacity to organize themselves. Some CBOs go beyond sharing information via the Internet. Rumah Blogger Indonesia Bengawan, for example has organized ICT trainings for marginalized communities including disabled persons, commercial sex workers, women and Small and Medium Enterprises, or SMEs (Nugroho 2011). Nugroho also identifies the dangers in 'click' activism by noting that the act of physically joining a protest is ultimately far more meaningful than clicking "Attending" on a Facebook invitation or "Like" on a Facebook page.

Both international organizations promoting ICT4Ds and local advocates of cyber activism have identified similar key factors for successful implementation of ICTs for social and economic causes and likewise warned about the dangers of viewing ICTs as a solution in itself, as opposed to as a mechanism for facilitating development programs and social movements that already have gained legitimacy in the physical, non-digital world. As the SDC has argued, “ICTs are instrumental, not a goal in itself, and they should serve to improve the practice of development cooperation” (2011, 3). Yanuar Nugroho, writing about the use of social media by civil society, has added:

One can mistakenly favour technicality over the involvement of human agency... the focus of civil society should be the development of the agency's capabilities, not only in using and appropriating technology but in building comprehension of the dynamics of civil society and a wider societal realm. (Nugroho 2011).

The success of ICT4D tools also depends on whether or not the country in which they are implemented provides a conducive environment for such tools to succeed. Notably, however, whether or not a country is conducive for high mobile phone penetration does not seem to be a result of the country's GDP level as can be seen by the high penetration of mobile phones in Indonesia and other Asian countries. Instead, the World Bank has indicated that the following are more telling factors: “(a) small geographical area; (b) good market conditions; (c) conducive policy environment; and (d) high population density” (Bhavnani 2008, 10). These factors also likely correlate with the effectiveness of ICT4D tools in different countries. Extensive mobile reach, however, does not seem to always be a necessary determinant of the success of ICT4D tools. Kenya, for example, had less than 1 mobile phone subscription for every 2 people in 2005,

two years after the M-PESA application was successfully launched. By 2010, M-PESA had 9.5 million registered users, twice the number of adults registered with bank accounts (*Microfinance Focus* 2010). However, a conducive policy environment is certainly key, at least for ICT4D tools involving financial transactions. In the case of M-PESA, the Central Bank of Kenya made adjustments in agent banking regulations that were key to the success of the M-PESA product.

Mobile banking has also been quite successful in the Philippines, where The Central Bank of the Philippines created a legal framework that both promoted and regulated mobile banking through the General Banking Law of 2000. On the other hand, the strict regulations barring non-bank institutions from handling money that have been maintained by the Reserve Bank of India have been criticized as creating a barrier to the success of mobile banking in India (Metre 2011). As in India, efforts to create mobile banking products in Indonesia have thus far been severely limited by central bank regulations on which types of institutions can handle financial transactions.

Outside of mobile banking, however, government regulations are generally less relevant to the success of ICT4D tools. Though regulations on Internet frequency use have been implemented through the Information and Electronic Transaction Law, the Government of Indonesia has also recognized the right to information as a fundamental human right through the enactment of the Freedom of Information Law in 2008. The non-profit organizations interviewed by the author in Indonesia did not identify any major challenges that they faced in the form of government regulations when attempting to implement ICT4D tools; the exception being Mercy Corps, which encountered regulation barriers while attempting to establish mobile banking services. On the contrary, some



local NGOs like PUPUK in Bandung were largely aided by free software that they received from and that had been developed by the Indonesian Government. Yet at the same time, attempts by the Indonesian Government to initiate its own ICT4D tools have at least on one occasion been problematic as will be further discussed later in this report.

Another much more substantial problem is that Indonesia's telecommunications industry has been extremely centralized resulting in certain areas of Indonesia (namely urban centers in Java and Bali) being far better connected than areas outside of Java and rural areas in general. As Okta Setiawan of the AirPutih Foundation has noted, the Government is largely at fault for the lack of investment in equal IT infrastructure distribution and facilities, which in turn leads to unequal knowledge across Indonesia about the various uses of the Internet and mobile phones (Interview November 2011). Nugroho argues that this is a result of the centralized development policy that has existed since the 1960s in Indonesia (2011, 28). In that sense, the government has failed to ensure more even disbursement of information despite recognizing the right to information as a fundamental human right. Likewise, cable broadband distribution is

severely limited to major cities and after 20 years of industry protection has experienced no growth. (On the other hand, wireless networks are growing rapidly). Thus perhaps it is the government's lack of regulations, at least in regards to where and what types of telecommunications infrastructure is set up, that are to blame for the infrastructure limitations facing the use of ICTs for development in Indonesia.

In general, the World Bank has identified the following actions as steps that the public sector in any developing country could take in order to support the development and implementation of ICT4D tools:

- (a) creating an enabling environment for competition of service providers; (b) developing the communication infrastructure; (c) developing locally relevant content which meets the needs of the poor; and (d) providing education and training programs in IT enabled services to boost skills and training" (Bhavnani 2008, 9).

Arguably the government of Indonesia has followed steps (a), (b), and (d) to some extent. Step (c), meanwhile, has been taken on by a variety of both international and local organizations utilizing ICTs for development aims in the country.

IV.

ICT4D Case Studies in Indonesia

4.1. Mercy Corps & Mobile Banking

By now, the largest Mobile Network Operators (MNOs) in Indonesia—Telkomsel, Indosat and Excel—and corporate banks have all set up mobile banking systems. However, for the most part it appears that most customers of mobile banking services are currently those who already have bank accounts (and thus are financially stable enough to maintain formal bank accounts). Moreover, many of the existing mobile banking programs have met with limited success in terms of uptake. The Bank of Indonesia has created e-money regulations that were meant to allow payments to be done via mobile phone. However, initial licensing requirements remain difficult to meet and overall confusion over these regulations has led to slower movement towards the use of mobile money services by MNOs and banks (World Bank 2010, 9).

According to Andi Ikhwan, the Monitoring and Evaluation Manager at Bank Andara, MNOs currently face many limitations due to Central Bank regulations. For Telkomsel, for example, if a customer is not registered with their mobile

banking service T-Cash (only uses pre-paid services), the maximum transaction possible is 1 million rupiahs (US\$100). If the customer is using post-paid services, the transaction made can be up to 5 million rupiah (US\$500). Since most lower income mobile phone users utilize pre-paid services, this means that the poor in general are limited to making transactions of 1 million rupiah (US \$100) or less. Meanwhile, post-paid services generally target the middle-income class. In general, regulations on MNOs and cash-in, cash-out systems have meant that services like T-Cash have not taken off. Additionally, in order to access T-Cash services, a customer has to go to Telkomsel or a Telkomsel agent, like Indomart, which are only found in Jakarta and in other urban areas. At stands, a customer can top up his/her account, but not cash out. Due to the strict regulations, Telkomsel is not investing more in these services and as a result, the systems necessary for providing mobile money to lower income individuals aren't being built.

The Central Bank has recently begun discussing with MNOs and banks about building partnerships. However, competition between banks and MNOs in the area of mobile banking has inhibited the



productivity of such discussions. Specifically, MNOs are sending letters to the Central Bank to try to convince them to allow for products similar to Kenya's M-PESA in Indonesia, while at the same time the banks are also sending letters to the Central Bank opposing such an idea and suggesting that such activities may allow for money laundering. According to Ikhwan, this is likely because the banks are afraid of losing some of their market to MNOs. Other organizations also face limitations from the Central Bank. BPR KS, based in Bandung and the largest BPR (rural bank) in Indonesia, also provides POS (point of sale) devices to MFIs (microfinance institutions). However, BPR KS can only do payments, as they are not allowed by the Central Bank to do remittances via POS. Overall most MNOs and banks in Indonesia are not interested in trying to reach the unbanked poor, focusing instead on middle and upper income groups (World Bank 2010, 16).

Bank Andara, however, aims to use technological innovations to assist microfinance institutions in providing services to the less privileged. Bank Andara's current mission is "to be the premier, pioneering financial partner of the Indonesian microfinance sector, promoting innovation and massive outreach to those lacking access to financial services." Bank Andara started as a retail bank that was bought by Mercy Corps and transformed into a wholesale bank in 2008. With technical support and product development assistance from the Gates Foundation, bank lending began in Java and Bali in 2009 with a mission of reaching 1 million people. Currently the bank works with 465 Microfinance Institutes (MFIs), women's cooperatives, and other partners and has expanded to Sulawesi, Kalimantan and Nusa Tenggara.

Bank Andara's services must comply with Central Bank regulations, and include: savings, loans, and a service called "andara link" which uses Andara Bank's status as a fully licensed commercial bank to provide payment services (such as bill and remittance payments) to MFIs. Andara Bank has also built a web portal to record transactions that are done in the field through POS devices that Andara Bank provides to MFI account officers. This in turn allows MFIs to access clients that are unable to make it to the MFI branch offices. Most recently, Andara Bank launched "Andara Link Mobile" (in pilot phase, as of November 2011), which works with a CDMA operator called Smart Friend.² Through this program, Samsung Smart Phones will be given to MFI account officers who have already been using Andara Link and have reached a certain quota for transactions. These phones in turn enable bill payment services (such as for electricity and Telkom Speedy internet) and potentially will assist with payments for pre-paid and post-paid services as well, such as cable television.

Smart Friend's mobile banking differs from mobile banking products (such as T-Cash and Dompotku) that are set up by MNOs such as Telkomsel, Indosat and XL, in that Smart Friend wants to work in partnership with the banks. While the CDMA connection that Smart Friend utilizes can be more difficult to get a signal on than GSM connections, setting up this connection does not require an exclusive agreement with a specific MNO. While there is some competition between banks and MNOs, the MNOs cannot expand their services for products such as T-Cash and Dompotku until they get approval from the Central Bank to do so. Telkomsel is starting to discuss with commercial banks about working together on T-

2 CDMA (Code Division Multiple Access) and GSM (Global System for Mobile Communications) are the two main contrasting types of mobile phone technologies currently being utilized. They differ in terms of how data is converted into radio waves. CDMA is newer but these connections are generally locked to one network provider as opposed to GSM, which makes use of SIM cards, and still is used by the majority of mobile phone users in the world.

Cash, but up until now these services are only run by the MNOs. For now, Telkomsel is still waiting to hear from the Central Bank about regulations that affect the feasibility of such partnerships.

The Central Bank does not allow transfers of money from MFIs to rural banks, but if MFIs use Andara Link they can transfer the money through Bank Andara due to its commercial bank status. Once the system goes live, MFI clients will be able to send remittances and make use of other bank services without going to a bank.

Bank Andara's strategy is not to work directly with the customer but rather to ease customers into the concept of using mobile phones for banking through their account officers. In Bali, one BPR tried to give mobile phones to rural clients but they did not trust the BPR representatives who they saw as strangers. So instead, Bank Andara worked with the account officer so that the client could first see how the officer used the mobile phone to make transactions and in this manner, they were slowly able to build trust with the clients. With International Finance Corporation (IFC) support, Bank Sinar in Bali is also trying to educate their clients on how to use mobile phones. If the Bank Andara pilot succeeds, Bank Andara will try to work with other MNOs to see if clients can use their existing providers to facilitate banking services. (Ikhwan himself uses a mobile banking service provided by BCA called m-BCA.)

Mercy Corps has conducted internal studies on domestic remittances to understand how people in various sub-districts are sending money and what competition exists for Andara Bank's remittance services. According to Mercy Corps' studies, 70% of ATMs are located in greater Jakarta, big cities, and Bali. It thus seems that financial services, as with telecommunications in Indonesia, remain highly centralized in Indonesia. According to

Ikhwan, people in Kalimantan, and even Sumatra, often need to use boat drivers to send domestic remittances.

Andara Link's main competitors are *PT Pos Indonesia* (the national post system) and *Bank Rakyat Indonesia (BRI)*. *PT Pos Indonesia* uses the Western Union system, which is often used by those who don't have bank accounts. Western Union has approval from the Central Bank allowing them to do domestic remittances. However, the post services are not available all over Indonesia. While security is not an issue for Indonesia as it is in Kenya, distance traveled to post offices (even in Bali) and long lines once in the post offices do hinder the use of remittance services. Thus the problem is more one of time-cost savings rather than security. Time-efficiency is the first reason to use mobile phones and is also why MFIs and cooperatives are utilizing them. MFI account officers can travel by motorbike or car for pick up services for savings or loan installments in the field. The pick up service, *jemput bola*, is used by MFIs and cooperatives to compete with the big banks, and utilizes POS devices to do transactions in the field. Sometimes the signal drops for the POS device, in which case the officer just collects the bill and does the transaction when he/she returns to the office and then returns to the customer the next day to provide them with the receipt. These MFIs, which Andara Link often offers bundled services to, tend to be credit unions that serve about 100,000 farmers.

Mercy Corps also plans to use the platforms built by Andara Bank for other Mercy Corps initiatives and an "agriculture mobile and financing" program is currently in the process of being built. Andara Bank is also working with a partner in Manila on agricultural products and mobile phones in the Philippines (Interview with Andi Ikhwan, November 2011).



4.2. Disaster Relief and Alert Systems

As a country that has long been exceptionally prone to natural disasters, Indonesia should benefit from the use of new technologies to improve disaster alert and relief systems for people living in coastal areas in danger of being hit by tsunamis or those living near volcanoes that are active and may erupt. Thus far, a wide variety of government agencies, local NGOs, international NGOs and media groups have collaborated in utilizing mobile phones and the Internet to increase the efficiency with which warnings can be delivered to people on the ground prior to a natural disaster and also to more efficiently get help and resources to victims of a natural disaster once it has occurred.

Before the tsunami of 2004 hit Aceh, Air Putih Foundation had largely focused on providing free trainings to CBOs in computer and Internet usage, implementation of open source software, and application usage assistance for *SIMKES* (Health Management Information System) to community health centers (Interview with Okta Setiawan, November 2011). Air Putih Foundation first became involved in disaster relief by restoring communications and providing Internet access to the devastated region of Aceh, within two days of the tsunami. This Internet connection in turn proved crucial to the implementation of humanitarian relief from other organizations (Nugroho 2009).

Now, Air Putih Foundation collaborates with AJI (Independent Journalists Alliance), Tagana (Youth Disaster Preparedness), SAR (Search and Rescue), as well as other local and international NGOs in order to help enable the use of ICTs in disaster areas and facilitate cooperation and task allocation efficiently between different parties during disaster situations. Air Putih Foundation has also worked

with the United Nations, PMI (Indonesian Red Cross), and government agencies such as BNPB (National Disaster Management Agency) and BPBD (Local Disaster Management Agency).

Air Putih Foundation has also created an Early Warning System, through which they can broadcast SMS with information about potential tsunamis to all mobile phone numbers listed on their server through a program called SMS Gateway. Using SMS Gateway, Air Putih Foundation is able to broadcast thousands of tsunami alerts to the many numbers that are registered on their server.

In Sri Lanka, Samarajiva and Waidyanatha have also concluded that cell broadcasting (using a server to send large numbers of texts simultaneously) can be very useful when combined with traditional public warning methods in areas where mobile phone usage is relatively high. The Indonesian Government, moreover, has provided cell-broadcasting units to local government BPBD offices. These units, however, along with the BPBD offices themselves, are generally quite new and not yet established in all districts at risk of natural disasters.

In Central Java, four districts still do not have official BPBD offices. The district of Kebumen, however, acquired a BPBD office in October of 2010. The traditional alert system procedure was that if a tsunami warning were to be issued by the national government in Jakarta, it would be sent directly to every BPBD office and from the district government office, the sub-district (*kecamatan*) offices would be alerted in at-risk coastal areas and then these offices would alert the village heads in at-risk coastal villages. If each of these alerts were to be delivered one by one via phone calls, it would likely take quite awhile before a tsunami alert from the national government reached village heads and

then the villagers at risk of being hit by the tsunami. Unfortunately, tsunami warnings generally cannot be made at the national government level more than a few minutes before the tsunami will strike. As such, the speed at which a tsunami warning is delivered from the national government to the at-risk populations is of critical importance.

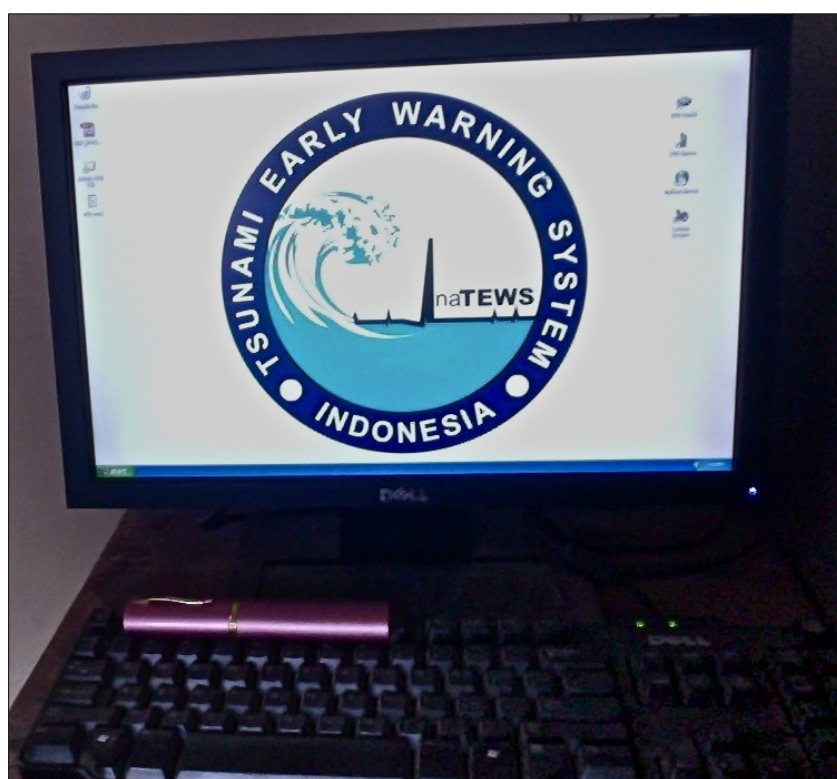
Now, with the cell-broadcasting unit provided to the Kebumen BPBD office by the National Meteorology and Geology Agency (BMKG) in 2010, alerts from the national government can be sent directly by text to as many mobile

national government to the BPBD office—but the message would still have to be relayed via phone call from the district-level to the *kecamatan*-level and then individually to each village head before reaching the villagers. As it stands, therefore, the capacity for quicker delivery of tsunami warnings has not yet been optimally utilized in developing the protocol to be used in the event of an actual tsunami. Officials at the BPBD office recognized that the system was not yet being used optimally and explained that this was in part due to their concerns that village heads and/or villagers would not trust text alerts coming from an unknown

number. When it was suggested that they might provide trainings to village heads that would clarify how the system operated, the officials explained that the office did not have the resources for such trainings and blamed bureaucracy for the lack of initiative taken on fully implementing the cell-broadcasting program (Interview with Ahkmad Sofwani and Made Wirawan, April 2012).

Though the effectiveness of mobile phone enabled disaster alert systems in Indonesia is not yet clear, the use of ICTs to assist in disaster relief has at least on one occasion proven to be very successful. In the wake of the October 2010 eruption of Mt.

Figure 4: BPBD cell broadcasting unit in Kebumen, Central Java



(Source: Author's photo)

phone numbers as the BPBD office enters into its system. As of April 2012, however, the only mobile phone numbers that had been entered into the system were those of the Kebumen BPBD office members (most of them) and the *Bupati* (elected district head) of Kebumen District. As a result, the alert would likely travel more quickly from the

Merapi in Yogyakarta, the organizations Jalin Merapi and Combine Resource Institution used Twitter to organize and distribute resources, particularly food and water, urgently needed by refugees who had survived the eruption. Volunteers used two-way handheld receivers or SMS text messaging via mobile phones to send information about

the refugees and also about the volcanic activity to the organization Jalin Merapi. The information was then relayed to all of Jalin Merapi's tens of thousands of followers on Twitter; and from Twitter then automatically shown on Jalin Merapi's homepage and Facebook page and broadcasted over the community radio network (Nugroho 2011). The website itself provided clear links to all forms of communication between volunteers and Jalin Merapi. Within a few hours, requests made for water via Twitter had been met and new requests were being made and met as needed. Jalin Merapi's success supports the findings of Samarajiva and Waidyanatha who argue that a combination of SMS communication and a robust website are key factors in successfully using ICTs to enable cooperation between disaster relief agents (2009). Jalin Merapi goes a step further by heavily using social media as well.

Air Putih Foundation also provided disaster assistance for the 2010 Merapi earthquake, as well as the 2011 tsunami in Mentawi. In these cases, Air Putih Foundation used mobile phone technology combined with mapping applications and SMS Gateway to map out reported information from various individuals on the ground. The mapping was done through an application called Ushahidi, through which people all over the world can tell the story of what is happening to them — or around them — during a disaster; and share their story through SMS texts.

Air Putih Foundation is now also trying to develop "Open BTS" technology, a simplified version of mobile technology that could be setup for public use in rural areas without depending on a major network operator. In this way, they hope that it will be possible for communication to become organized by society rather than companies.

4.3. Mobile Phones and Maternal Health

Disaster alerts and relief information are not the only types of information that are relevant and needed in Indonesia. Another type of information that can and has been improved through the use of mobile phones, for example, is maternal health. Mobile health, or m-health, like mobile banking is an idea that has taken off internationally, and lead to the creation of m-health tools in countries such as Ghana, Uganda, South Africa, Bangladesh and India. Many m-health tools involve directly messaging mothers with timely information about steps to take to address their health needs at different stages of their pregnancy and nursing. SMS texts have also been used to send relevant information for preventing and controlling the spread of HIV/AIDS in South Africa. Meanwhile, in Aceh Besar, Indonesia, a project was piloted to enable faster, more timely transfer of information between doctors, nurses and mothers, in addition to providing an efficient means for sending patient health data to a central database. This Midwives Mobile Phone project, in addition to creating a more effective method for sharing health information, also was used to improve emergency response times and effectiveness (Chib, 2010).

The same 2004 tsunami, which initiated Air Putih Foundation's involvement in disaster relief, was also behind World Vision's launch of the Midwives Mobile Phone project in Aceh-Besar in 2005 (Chib, et. al 2008). Estimates for the number of midwives killed or missing as a result of the tsunami ranged from 600 to 1,650 (United Nations 2005, referenced in Chib 2010). Moreover, the region only had one hospital located in the main city of Banda Aceh and village health posts were not equipped to deal with emergency situations (Chib, et. al. 2008, 353). Through the

Midwives Mobile Phone project, mobile phones were provided to midwives, midwife coordinators and obstetrician-gynecologists (OBGYNs) at the provincial hospital. They were then linked to the health centers, midwife's association, administrators and researchers on the project, and a central server that received, uploaded and collated data. An Internet interface further linked government health agencies and United Nations bodies to an information system that showed the data being collected (Chib 2010, 506).

In 2007, World Vision conducted a survey with midwives in the program in order to evaluate the effectiveness of using mobile phones to improve maternal health in Aceh. The randomized survey found that mobile phone use by health practioners led to: a slight increase in patient numbers, greater time and cost efficiencies, work efficiency (in being able to send data directly to the database by mobile phone), greater ease in seeking assistance from fellow health practioners, more patient monitoring and consultation, and improved and more efficient collection and updating of patient health records. Midwives also found that they gained more respect from patients through their quick access to expert medical advice and that relationships between colleagues improved. World Vision also sent weekly SMS texts with maternal health information to midwives and provided them with subsidized monthly call credits (Chib, et.al 2008, 357-8).

Despite the overall success of the project, concerns remained in regards to sustainability (financially in terms of paying for airtime credit), the uneven telecommunications network coverage, and economic constraints and lack of technical know how that were thought to limit the use of more complex technologies such as computers and the

Internet by midwives. (Chib, et. al. 2008, 358). Most of these concerns, ultimately, could likely apply to other ICT4D initiatives in Indonesia addressing issues both inside and outside of health.

4.4. PUPUK Bandung & Market Commodity Price Information for Farmers

As with disaster relief and maternal health information, mobile phones have also been found as a useful tool for sending market information to farmers living in remote rural areas with limited access to information about buying and selling prices for their commodities outside of their villages. One organization that has worked towards assisting farmers in sharing and receiving timely market information is PUPUK, an Indonesian organization that largely focuses on supporting Small and Medium Enterprises (SMEs) and is based in Bandung, with branch offices in Surabaya, Yogyakarta, and Makassar.

PUPUK's development of an SMS-Based Market Information System for Farmers began in 2007 as a partnership with the Indonesian Ministry of Research and Technology (BBPT) that made use of a BBPT ICT Division program to socialize free open source software. One of the PUPUK senior experts wanted to utilize Linux-based open source software developed by BBPT to create a market information system for farmers. The software application was first tested with cocoa farmers in Beirau, East Kalimantan with funding from a coal company in the area. The program was then discontinued after one year. Following this, PUPUK offered to implement the program as a Corporate Social Responsibility (CSR) project for another coal company, Kaltim Prima Coal (KPC),³ in a different district of East Kalimantan: East Kutai.

3 KPC is 50% owned by Indonesians, and 50% owned by Indians and a subsidiary of Bumi Resources, Ltd.

Starting in 2009, the BBPT software application was implemented by PUPUK to create a market information system for patchouli (oil essence) farmers living in villages within an approximately 80-kilometer radius from the KPC plant. The three sub-districts covered within this area are: Sangatta, Bengalon and Rantau Pulung. Diversity of crops is low as the main crop farmed in this area is patchouli, but the SMS-Based Market Information System currently provides prices for 15 commodities.

Following the development of the program in East Kalimantan, a similar program was set up in the East Java district of Banyuwangi as a CSR project for the gold mining company *Indo Multi Niaga*. Since villages are located closer together in the more densely populated province of East Java, a smaller area (25-50km radius from the gold mine) is being used for this project. Instead of covering 3 sub-districts, the project covers 5 villages in the sub-district of Pesanggaran—Pesanggaran, Sumber Agung, Sumber Mulyo, Sarongan, and Kandangan. The variety of crops grown by farmers in East Java is more diverse and as such there are currently 30 commodity prices listed in the system and more commodities are added as farmers request them.

The systems in East Kalimantan and East Java are slightly different but the process and software applications are the same. In each district, PUPUK met with the heads of villages that were selected for the program and explained the function of the SMS-Based Information Market System and how it worked. PUPUK also explained that the costs of the program would be covered by the corporate sponsor for the first year but following this, the village farmer collectives would have to pay for the system from their membership dues. Farmer collective leaders generally collected dues to pay for individual farmer emergency needs (such as hospital visits) and these dues ranged from 10,000 rupiah (US \$1)- 20,000 rupiah (US \$2) per month

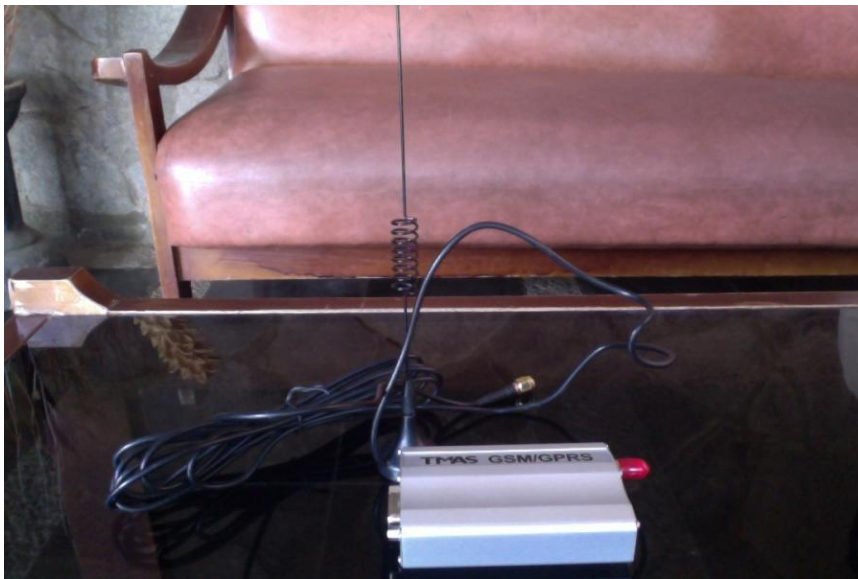
per member. All village heads agreed to participate in the program. The cost of the program works out to about 5,000 rupiah (US \$5) per farmer in East Kalimantan and 10,000 rupiah (US \$1) per person in East Java.

In each district, there is a volunteer server administrator that operates the server. In East Kalimantan, the server computer is located in the KPC office and operated by a KPC Department of Community Empowerment staff member. In East Java, the server computer is located in the Pesanggaran sub-district's Department of Agriculture office and operated by a government employee. In each location, the server computer is connected to a GSM/ GPRS modem that utilizes a Telkomsel SIM card to send messages from the software application on the server to registered member cell phone numbers. Telkomsel is the chosen Mobile Network Operator (MNO) because it is regarded as having the best service in both locations.

In East Kalimantan, the modem used is a Simmons TMA-M39i, which is larger, more expensive and more difficult to use than the model used in East Java, but has a stronger signal which is necessary due to higher frequency of extreme weather in Kalimantan. The TMA-M39i device costs 2 million rupiah (US\$ 200) and connects to computers through a serial port and thus requires an extra cable to connect to a laptop. The device can be used for Internet but since few farmers have Internet access or are well versed in how to use the Internet, PUPUK only uses the mass SMS-sending feature of the device to communicate with members. (See below for an image of the TMA-M39i device used in Kalimantan).

In East Java, a smaller GSM/ GPRS device, the iTegno 3800, is used and connects to the computer directly through a USB port. This device is slightly

Figure 3:TMA-M39i device used in Kalimantan



(Source: Author's Photo)

cheaper, costing 1.8 million rupiah (US\$180), but is not as robust as the TMA-M39i. However, the signal in East Java is good enough that this device has proven adequate. Both of these GSM/ GPRS devices were chosen largely because of their effectiveness in sending and receiving mass texts messages. These devices can send and receive up to 1,000 messages per minute. PUPUK decided against using GSM/ CDMA Smart Phones as the modem because of their relatively limited storage capacity. Though Warana Unwired in India does use these Smart Phones to operate a similar SMS-Market Information Dissemination System for farmers in India (Veeraraghaven et. al. 2009).

The server administrators in each of the districts serviced by PUPUK fill in the commodity prices for the province (East Kalimantan or East Java prices) and for the export market (Jakarta prices). Being based in larger cities, these administrators have access to information both from the local Ministry of Trade and Ministry of Farming agencies and from the Internet. Commodity prices for each of the member villages are also collected from an "Informant" in each village. The Informant

is generally the head of the village's farmer collective and is initially provided 20,000 rupiah (US\$2), and a maximum of 50,000 rupiah (US\$5) of airtime credit per month to use on their personal phones to send weekly text messages (or more if possible) to the main server with updates on the market price of commodities for that village. The text messages sent to the server use the format found in Table 3. This allows the server to properly update each commodity's price based on

location. (Only 10 of the 30 listed commodities are shown in Table 3).

Because roads are of poor condition in East Kalimantan, Informants generally find it difficult to go to the market more than once a week. In East Java, a trip to the market also involves travelling significant distances but the roads are generally better. Informants may now also SMS the buyer instead of making the trip to the market to get the market price. Prior to setting up this system, a farmer would have to call a buyer at the market in another town in order to gain information on the selling price, and would be unable to verify this information against other buyers.

Every farmer group leader (Informant) sends his member's names and mobile phone numbers to the main server in their district. Member farmers can then text the server using specified codes to access information for any of the listed commodities in Jakarta (for export), in the province, and for any of the individual villages listed in the system. At the start of the program in each district, PUPUK held a large training for the farmers on

Table 3: SMS Gateway codes used for submitting commodity price information

SMS Gateway Pesanggaran District: SMS Command Format for Sending Commodity Prices				
#	Commodity Name	Area	SMS Command Format	Example of SMS
1	Gabah Kering Sawah (<i>Unhusked Rice Paddy</i>)	PESANGGARAN	KIRIM GKS PSG [HARGA] (<i>SEND Unhusked Rice Paddy Pesanggaran [PRICE]</i>)	KIRIM GKS PSG 2600 (<i>Send GKS PSG 2600</i>)
2	Gabah Kering Sawah	SUMBER AGUNG	KIRIM GKS SBA [HARGA]	KIRIM GKS SBA 2650
3	Gabah Kering Sawah	SUMBER MULYO	KIRIM GKS SBM [HARGA]	KIRIM GKS SBM 2650
4	Gabah Kering Sawah	SARONGAN	KIRIM GKS SRG [HARGA]	KIRIM GKS SRG 2600
5	Gabah Kering Sawah	KANDANGAN	KIRIM GKS KDG [HARGA]	KIRIM GKS KDG 2600
6	Gabah Kering Lumbung (<i>Unhusked Rice Grains</i>)	PESANGGARAN	KIRIM GKL PSG [HARGA] (<i>SEND Unhusked Rice Grains Pesanggaran [PRICE]</i>)	KIRIM GKL PSG 3300 (<i>Send GKL PSG 3300</i>)
7	Gabah Kering Lumbung	SUMBER AGUNG	KIRIM GKL SBA [HARGA]	KIRIM GKL SBA 3300
8	Gabah Kering Lumbung	SUMBER MULYO	KIRIM GKL SBM [HARGA]	KIRIM GKL SBM 3300
9	Gabah Kering Lumbung	SARONGAN	KIRIM GKL SRG [HARGA]	KIRIM GKL SRG 3300
10	Gabah Kering Lumbung	KANDANGAN	KIRIM GKL KDG [HARGA]	KIRIM GKL KDG 3300

(Source: PUPUK Bandung; English translations by Author; Price = Rupiah per Kilogram)

how to use the SMS-Based Market Information System and the short-hand SMS codes involved. They were each also provided with a hard copy of the format list for requesting information on prices. Sample commands from the format list can be found translated into English from *Bahasa Indonesia* in Table 4.

Routine meetings are also held on a monthly basis to address farmer's concerns and to update the server with new commodities as requested. In addition to providing information on prices, the SMS broadcast (two-way communication) system

can be used to send news alerts to all or specific group members. For example, message alerts can be sent to invite farmers to meetings and can also be used to issue notifications about weather, climate and pest concerns.

This SMS-based information system, like all ICT4D tools, comes with both costs and benefits. The server system in East Kalimantan costs 25 million (US\$2,500) while in East Java it costs about 40 million (US\$4,000). In both districts, the monthly maintenance costs include about 50,000 rupiah (US\$ 5) for electricity; 200,000

Table 4: SMS Gateway codes used for requesting commodity price information

SMS Gateway Pesanggaran District: SMS Command Format for Requesting Commodity Price Information			
#	Commodity Name	Area	SMS Command Format
1	Gabah Kering Sawah (Unhusked Rice Paddy)	PESANGGARAN	HARGA GKS PSG (PRICE Unhusked Rice Paddy Pesanggaran)
2	Gabah Kering Sawah	SUMBER AGUNG	HARGA GKS SBA
3	Gabah Kering Sawah	SUMBER MULYO	HARGA GKS SBM
4	Gabah Kering Sawah	SARONGAN	HARGA GKS SRG
5	Gabah Kering Sawah	KANDANGAN	HARGA GKS KDG
6	Gabah Kering Lumbung (Unhusked Rice Grains)	PESANGGARAN	HARGA GKL PSG
7	Gabah Kering Giling (Milled Rice)	SUMBER AGUNG	HARGA GKG SBA
8	Beras Medium (Medium Quality Rice)	SUMBER MULYO	HARGA BRM SBM
9	Glondong Basah (Whole Fresh Maize)	PESANGGARAN	HARGA GLB PSG
10	Glondong Kering (Whole Dried Maize)	PESANGGARAN	HARGA GKL PSG
11	Pipilan Basah (Fresh Shelled Corn)	PESANGGARAN	HARGA GKS PSG
12	Pipilan Kering (Dried Shelled Corn)	PESANGGARAN	HARGA GKS PSG
13	Kacang Kedelai (Soya)	PESANGGARAN	HARGA GKS PSG
14	Cabe Merah (Cayenne Pepper)	PESANGGARAN	HARGA GKS PSG
15	Melon	PESANGGARAN	HARGA GKS PSG
16	Buah Naga (Dragon Fruit)	PESANGGARAN	HARGA GKS PSG
Notes	- All SMS sent to number 0852-2099-2029		
	- Price which is listed is price per kilogram (Rupiah)		
	- Sending form only applies to Informants		
	- The prices listed above are only provided as examples		

(Source: PUPUK Bandung; English translations by Author)

(US\$ 20) rupiah for sending SMS messages (after the initial text messages are sent, many of the text messages are free due to promotions from the service provider); and a maximum payment of 50,000 rupiah (US\$ 5) per informant (there are 4 informants in East Kalimantan and 5 in East Java). As mentioned before, the job of the server administrator is voluntary and will remain

so even after the one-year corporate subsidies are over.

In East Kalimantan, there are currently between 80-100 members using the system and the total cost of running the system is about 450,000 rupiah (US\$ 45) per month. After the subsidy is over, this should work out to about 4,500 rupiah (US\$0.45)



per farmer per month, which will come from the farmer collective membership dues. In East Java, there were initially about 50 farmers though this number has increased to around 80 farmers. The cost of the system in East Java is about 500,000 rupiah (US\$50) per month. As such, when the subsidy is over, the cost per farmer will be closer to 6,500 rupiah (US\$0.65) per farmer per month. However, since incomes and living costs are generally higher in East Java, this difference in cost between the provinces should not alter the ability of the farmers in each region to pay for the service.

According to Haris Kurniawan, ICT Officer at PUPUK Bandung, most farmers in these communities (and even little children and older men) have a mobile phone. 200,000 rupiah (US\$ 20) is generally enough to buy a good mobile phone with a local plan. The mobile phone service in East Kalimantan is generally sufficient, particularly with Telkomsel. Indosat is considered to be okay though not as good as Telkomsel, and XL service is generally not very good in the area. The situation in East Java is similar though MNO service provision there may be slightly better.

Kurniawan provided the following example of how the service could be beneficial: In a small village in Kalimantan, a farmer would receive a price of 250,000 rupiah (US\$25) per kilogram of patchouli oil. However, when those farmers sell to a buyer from Java they know through the SMS-Market Information system that they can sell each kilogram of patchouli at a higher price—maybe 300,000 or 350,000 rupiah (US\$30 or \$35) per kilogram.

The extent to which differences in price matter was made clear through the following story: In 2009, a farmer in East Kalimantan almost burned his harvest because of how low the asking price

was. The cost of growing the crop was 150,000 rupiah (US\$15) per kilogram of patchouli oil and thus the farmer wanted to sell for at least 200,000 rupiah (US\$20) per kilogram. However, the asking price was far below 150,000 rupiah (US\$15) per kilogram. These kinds of problems cannot be solved by access to market information alone. Therefore, besides providing information from the market, PUPUK also wants to provide information to farmers on improving their means of production. For example, previously farmers used drums from oil containers to hold their patchouli oil, which resulted in a lower quality of oil and a lower sale price. PUPUK thus invited an expert from Bogor Institute of Agriculture (IPB) to provide training to farmers in East Kalimantan on improved production practices (this was also funded by KPC). Now the farmers use stainless steel instead of the oil drums and so they get a higher quality product and are able to sell the product at a higher price.

As PUPUK moves forward, they have met up with both opportunities and challenges in further developing mobile phone-based information programs. In terms of opportunities, the head of sub-Pesanggaran district in East Java has requested PUPUK's assistance in developing a system for the sub-district government for providing information to citizens but within a different scope of work. They want to be able to create an SMS-Based Information System that can be used by the local government to collect demographic data from local populations. In 2012, the sub-district head will ask the district government to fund the proposed system.

At the same time, PUPUK has had less luck in trying to work with the Bandung government. Last year, PUPUK made a proposal for Bandung's Department of Cooperation and SMEs to provide data for SME credit-level financial institutions in all of the provinces of West Java. However, the

government did not approve the program. Though Kurniawan noted that PUPUK has in the past assisted the Bandung government when asked, and particularly when the government is unable to meet the goals it sets for the end of the year.

PUPUK has also had challenges when trying to collaborate with the private sector. PUPUK attempted to create a new program using Unstructured Supplementary Service Data (USSD), such as the codes used to check phone credit (i.e. *123#) and those used by Fonetwish (*325#). However, Indosat informed PUPUK that it would cost them 1 billion rupiah (US\$100,000) to set up such a code through the MNO. PUPUK then inquired about the cost of creating a code through a content provider (i.e. companies that create and sell ring tones), however the cost was still prohibitively high at 100 million rupiah (US\$10,000).

4.5. MicroFranchises & Job Information Alerts

The idea behind the first Grameen Foundation AppLab in Uganda came from the Village Phone model in Bangladesh that was originally created by Grameen Telecom. Village Phone created a “business-in-a-box” in Bangladesh for (women) entrepreneurs to use to independently make an income and a similar mobile “microfranchise” was developed for entrepreneurs in Uganda. Most recently, the Grameen Foundation has established an IndonesiaAppLab based in Jakarta. So far, AppLab Indonesia has developed a mobile microfranchise meant to meet the demands of Indonesian entrepreneurs and has also begun developing a mobile-phone enabled job information application and mobile-phone enabled survey application, both of which are linked to the original microfranchise product.

UsahaKu (literally, “My Business”) is a suite

of applications that makes up what PT RUMA (a private business entity founded with support from Grameen) calls a “microfranchise.” The “microfranchise” created by Grameen AppLab is unlike a traditional franchise in that it does not charge a “franchise” fee. *UsahaKu*, therefore, might be more clearly understood as an “inclusive business” than as a “franchise.”

The first and most basic application in the microfranchise suite is *JualPulsa* (Mobile Airtime Selling), through which microfranchise entrepreneurs can sell mobile airtime from various operators. Initially PT RUMA partnered with the mobile network operator Esia, but now also partners with Telkomsel, Indosat, XL and with mobile phone manufacturers. Through the *JualPulsa* application, airtime from multiple operators can be sold through one mobile phone. For airtime sellers not using the *JualPulsa* application, multiple SIM cards from each operator have to be used to sell airtime or else airtime sellers go through agents for airtime from other operators.

PT RUMA scans and canvasses all the small villages in an area to find *warung* (food stalls) that are remote and not on the main road. In order to qualify for the PT RUMA microfranchise program the only criteria is that the *warung* manager is within the “bottom of the pyramid” (i.e., among Indonesia’s working poor) and is able/ willing to provide the 100,000-200,000 rupiah (US\$10-\$20) start-up costs. If the *warung* manager shows interest in the program, PT RUMA trains him/her on how to sell *pulsa* (airtime) and sells him/her a 50,000 (US\$ 5) rupiah starter kit. The field officer then returns to pick up PT RUMA’s share of the sales and to top of the *warung*’s inventory. The profit margin for the *warung* manager is about 4% and thus, in order to succeed as an airtime seller a large number of clients (scale) must be acquired. As such, PT RUMA’s responsibility is to



Figure 6: UsahaKu member selling pulsa, along with food, at his warung in Jakarta
(Source: Author's photo)



top up their electricity just as they would top up airtime—either through their mobile phone or at a *warung* with an airtime seller. Notably, the pre-paid electricity service, like extensive telecommunications and bank infrastructure, is limited to Java for now.

The latest application, which is still in development, is a bill payment product that would utilize an Electronic Data Capture (EDC) extension for a mobile phone. EDC can be used to pay electricity and water subscriptions, and possibly in the future microinsurance and

ensure that entrepreneurs have sufficient supply/ inventory stocked to meet the consumer demand for airtime, particularly from the most popular operators such as Telkom. Now PT RUMA raises money for buying airtime from multiple companies, such as Unitus, which also funded SKS Microfinance in India.

motorcycle installment payments. Since Indonesians already often buy motorbikes on credit, the idea is that installments can be paid at *warung* instead of at banks or the leasing company's payment point—and that time and transportation savings would result in reduced costs to the payment maker.

Another application in the microfranchise suite is the pre-paid electricity product *PulsaListrik*. The Government of Indonesia created the pre-paid electricity scheme as an alternative to paying a monthly bill in response to an electricity crisis in 2009. As a result of the crisis, the Government found that customers would be able to manage their finances better and be at a lower risk of running out of electricity if they bought a certain amount of wattage before use and received a token or number that would enable them to access that wattage. Initially the tokens could only be purchased at the bank or at a post office, but through the *PulsaListrik* application, customers can

There are about 25 *warung* per field officer and PT RUMA is now reaching over 10,000 entrepreneurs. There are 6 branches in the Greater Jakarta area (*Jabodetabek*) and there are plans to expand to Central and Eastern Java. In addition to expanding the geographical reach of PT RUMA's microfranchise system, PT RUMA will later run the *KerjaLokal* and Survey applications currently being developed by the Grameen Foundation.

KerjaLokal, literally “Local Work”, is a mobile phone based application being developed to provide relevant job information to job searchers based on skills and location, through a mobile phone.

This application is in partially based on a similar product in India called “BabaJob.com” The ideas behind BabaJob.com, in turn, were initially built off of the findings of a study based in Northern India, “Ending Poverty and Becoming Poor: Who Gains, Who Loses, and Why?” (Anirudh Krishna, 2003). The study found that most people fall into poverty from health related expenses and that in order to come out of poverty, multiple family members had to work multiple jobs. In order to find these jobs, people largely utilize their social networks, and those individuals with larger and more diverse networks were generally better able to find a job. Many domestic jobs were found through friends of friends, etc. However, the challenge remained of how to find job information that was closely related to the interests of the job seeker. Thus the idea was born of replicating how social networks work online (around the time that Facebook was launched in 2004).

Before BabaJob.com, the first version launched in 2006 was the “BabaLife” social network that targeted rural people and lower income folks in Bangalore. Within a few months BabaLife evolved into BabaJob and became a Bangalore-based project. Initially the program was only Internet-based, but even if users did not own a computer they generally would know someone who had access to a computer. Later the program evolved with the telecommunications revolution in India to become a mobile phone-based program. In 2009, BabaJob.com expanded its work by linking with telecommunication companies outside of Bangalore. The focus of the program was that it was more important to match

employers with job seekers based on location, skill set, languages spoken and salary—than just basing the match up on a connection. Yet, at the same time this connection was important for trust and so trust had to be incorporated into the building of the BabaJob platform by creating an online network that reflects real employer-employee relationships.

For the basic most popular job-search service, it costs the job seeker about USD\$ 0.60 per month to receive SMS-based job alerts every day with relevant job listings. Job seekers registered on the site fall into different economic segments and thus are qualified and looking for jobs with different salaries. According to Vir Kashyap, the Chief Operating Officer, about 5-6 main segments exist based on income levels and types of jobs being looked for. The lowest segment among these would be made up of those making about USD \$50 per month—however, at the moment only a small percentage of customers are in those lower segment though BabaJob.com hopes to reach out to more. The majority of registered job seekers instead fall into the range of making USD \$60 to \$200 (3,000-10,000 Indian rupees) per month.

Figure 7: Still from BabaJob promotional video



(Source: BabaJob.com promotional video)

According to Kashyap, the main benefit to customers using the Babajob.com service is in avoiding middlemen and outsourcing agents, which demand a large fee (10-20% of income) from job seekers and also from employers. The service is also meant to be more efficient and effective in finding better matches between employers and job seekers. The planned benefits of the AppLab Indonesia *KerjaLokal* program are similar, though the structure is slightly different.

Babajob's current focus is on scaling up. As of now, 800,000 jobs have been posted and 300,000 people are registered as seeking jobs. Babajob is trying to reach out to new markets by working with vocational schools. The idea is that by working with these schools, Babajob can know for sure that the people registered with their service actually have the skills needed for various jobs. This in turn can add to the validity of their postings and build trust. India is now training about 500 million people with vocational skills.

In the future, Babajob also wants people to be able to register for the service at the same places that they would buy mobile phones, top up credit, or recharge a phone. Babajob is also collecting data on their customers as a means for looking for other channels for how to find job seekers.

Thus far, the main method currently used for customers to find out about BabJob.com services is from receiving advertisement text messages from their mobile network operators. These operators will send a marketing message to customers that briefly describe the program and ask if the customer wants to sign up. Just as Indonesians have dealt with text-message scams, however, Kashyap notes that in India many mobile phone users have also been signed up for services that take money away from their accounts—meaning

that trust continues to be an issue that needs to be taken into account.

The Grameen Foundation and PT RUMA plan to avoid this problem of mistrust by having the same *UsahaKu* airtime sellers/ entrepreneurs explain the *KerjaLokal* service to their customers and then for each customer the entrepreneur registered, he/ she would receive a commission paid in airtime or airtime inventory that could then be sold to other customers. The customer registering for *KerjaLokal* would also pay a subscription fee, some of which would go to the Grameen Foundation and some would go to the entrepreneur. The subscription would be paid on a weekly basis at 3,000 rupiah (USD\$0.30) per week and the service would provide job information relevant to the customer's selected job category and location.

On the backend, the Grameen Foundation has a customer service department that canvases newspapers, the Internet, etc. and verifies job openings by calling to make sure the jobs aren't scams. They aim to verify information to the extent that is financially feasible. Later they will try to recruit companies for jobs such as: drivers, maids, carpenters, construction workers, and waitress—to work directly with the *KerjaLokal* service. The garment industry workforce is fluid in terms of how many people are needed at a time, so the Grameen Foundation plans to engage with them directly so that the garment factories can blast job recruitment message through this service. As with Babajob.com, Grameen Foundation aims to have *KerjaLokal* also used by households through a website that allows employers to advertise job openings and otherwise interact with the service. *KerjaLokal's* next step will be to incorporate a reference section, making the service overall more akin to a 'LinkedIn for the poor.'

Though customers with any type of mobile phone will be able to register for the *KerjaLokal* service at a *warung*, the application has also been pre-installed in all lower-end (non-smart) Esia brand phones since June 2011. As mentioned earlier, registering customers for paid mobile phone services in Indonesia may be challenging due to issues of trust. In recent years, there has been significant backlash against premium SMS services that spammed Indonesian mobile phones, provided unclear information about charge rates and were often difficult to unsubscribe from. Premium SMS services (such as ringtones, horoscopes, etc.) are delivered through SMS messages that cost more than normal SMS messages.

In one case, a man tried to unsubscribe from a premium SMS service and when he was not able to he complained in writing about the service in a newspaper. The content provider responded by suing the man who made the complaint. The man then reported this lawsuit to the police, who then tried to determine whether the content provider's actions constituted criminal practices or unfair business practices. The police in turn tried to sue the content provider. Following which, the Indonesian Telecommunications Regulation Agency (BRTI), and the legislature instructed all MNOs to stop all premium SMS services. As a result, value added services were hurt badly with income from such services dropping by 90% and the MNOs complained that it would take 2.5 years to come back from this drop. The music industry was also hurt by the Government mandate since they had otherwise previously been able to sell their music to ringtone companies. Finally the Government decided that as a compromise the companies would have to pay back all the money that they had stolen from customers and stop all current premium SMS services, but that once this had all been done premium services would be able to start again provided that there was a clear process

established for customers to unsubscribe from these services. In addition, BRTI froze the creation of new content provider licensees.

Since *JualPulsa* is not a premium service, it will not be affected by these restrictions. However, if at a later point the Grameen Foundation AppLab wants to transform *KerjaLokal* into a SMS service (rather than just a mobile phone application), this may prove difficult. As an application, *KerjaLokal* has its own separate inbox among the mobile phone's menu options. Through the application menu the following *KerjaLokal* services can be accessed: looking up job alerts, applying for jobs, terminating the service, and signing up other customers (if the user has been registered as an agent first). The way that the service is currently set up to work is that a customer shows interest in a job by clicking on the alert and confirming that they are interested in the job. Afterwards, PT RUMA will send the name and profile of the customer (and any other interested customers) to the employer. As the program is still at an early stage, it is not yet clear as to how this system will work for both employers and customers. For example, PT RUMA might find that employers are receiving too many applicants, in which case the system will have to be revised. The *KerjaLokal* application has been set to launch since August 2011 but the project has been delayed thus far due to legal concerns resulting from the recent BRTI regulation changes.

There are, however, some aspects of the backlash against MNOs that may potentially be used to the Grameen Foundation and PT RUMA's advantage. Specifically, as a result of consumer outrage towards premium SMS services, MNOs are now attempting to conduct a "White Campaign" to improve the general public's perception about SMS premiums and show that these services are not always bad. The Grameen Foundation is hoping that *KerjaLokal* might be able to become a part of



this campaign. It costs 17,000 rupiah (US\$1.70) for a job seeker to buy a weekly tabloid with job listings. Meanwhile, outsourcing agents takes a percentage of income and sometimes also require a sign up fee. However, labor demonstrations have shown that outsourcing agents are not popular among laborers since these schemes have been cutting away at the rights of long-term workers. However, the demand for outsourcing services is still high among employers and it has yet to be seen how the launching of *KerjaLokal* might affect this.

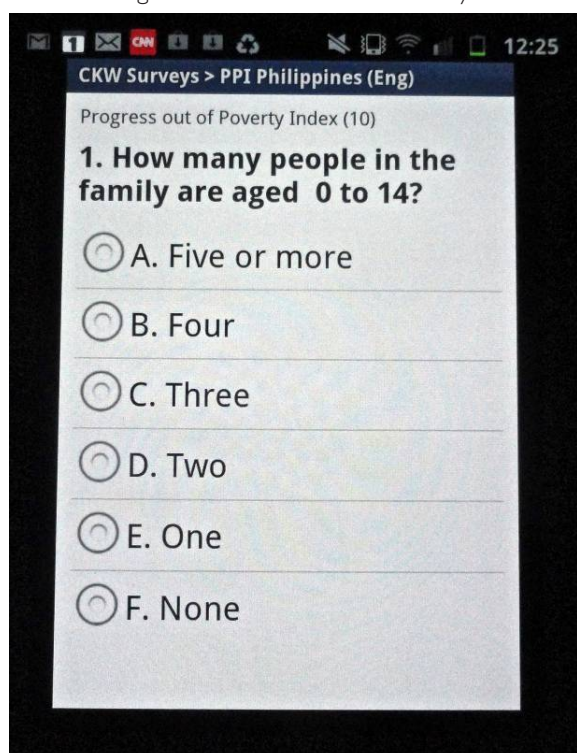
In February 2012, when the Grameen Foundation AppLab in Indonesia was planning the launch of the *KerjaLokal* application, they planned on having the product start in the Greater Jakarta area with three full time staff looking for jobs on the backend—with the application hosting a total of about 200 verified jobs per day. The idea is that the work of the three full time staff would eventually be paid off by subscription fees charged for the service. The proposed target was to reach about 60,000 customers within 15 months of the launch. Grameen Foundation also estimated that 2 million Esia phones with the application on it would be sold in those 15 months. Additionally, other customers would hopefully sign up through their old phones. The Grameen Foundation has also been looking for a partner with a content provider license that would enable *KerjaLokal* to eventually operate as an SMS service as well. If they are successful in doing that, they hope to launch a SMS version of the application within 6-8 weeks from the original launch. The Grameen Foundation also originally considered having the application start as a free service that would transition into becoming a paid service but this would be very costly and necessitate a larger subsidy for the program—the cost of the SMS texts alone were estimated to cost 2 million rupiah (US\$200) per day.

Among premium SMS services, there are two

major types: “pull” services, where the customer pays to request information, and “push” services, where customers pay to receive information. The services that had started the controversy were “push” services. Telkomsel has created a job information search service for Telkomsel customers called *B-Kerja*. However, according to Farid Maruf, Technology Manager of AppLab Indonesia, this service ends up being more costly through its use of the “pull” service. The problem with this service is that for every SMS a customer sends he/she must pay 300 rupiah (US\$0.03) plus the 1,000 rupiah (US\$0.10) for the service. Additionally, once *B-Kerja* sends the job information, the customer has to pay yet again to respond and show interest in the job position. According to Maruf who tested out the application as a customer, the total cost came out to about 7,000 rupiah (US\$0.70) in back and forth messages for one job offer. As such, AppLab Indonesia is more interested in using a “push” service with *KerjaLokal*, such that customers only pay a weekly subscription and the base 300 rupiah (US\$0.03) fee. With the current application setup for *KerjaLokal*, the customer is able to reply to alerts, but with a push SMS service, once a customer wants to follow up with one of the SMS alerts, he/she can do so on his/her own through the contact information acquired.

In the future, AppLab Indonesia hopes to create a premium service for employers where they pay for lists of qualified job seekers that they in turn can message directly. Alternatively, the service might allow employers to create an advertisement and send it through the application for a fee. Additional future plans might include a reference or evaluation system that asks job seekers to fill in information such as “how many years have you worked?” and “what is your referee’s phone number?” Lastly, AppLab Indonesia may try to create an extension to the website that allows job seekers to ask employers

Figure 8: Grameen Mobile Survey



(Source: Author's Photo)

to write an evaluation for them. However, it would be difficult to ask employees to write evaluations of employers if they do not have access to computers and/or the Internet. Eventually, Maruf believes that this may become possible through smart phones with survey style review systems built into menu options.

Yet another service currently being developed by the Grameen Foundation AppLab in Indonesia is a mobile phone-enabled survey application that will also be linked to the original microfranchise system. With the help from a grant from Salesforce.com and Cisco, the platform being developed will target NGOs and others who are interested in creating mobile surveys that can be quickly delivered to large numbers of people through an Android phone. PT RUMA has already spoken with Unilever, Nestle and others to discuss interest in the service. The platform is being

developed through Salesforce.com and survey data would be saved to their server. Two schemes for delivering these surveys currently exist. The first involves sending surveys to enumerators, while the second involves directly blasting the survey to respondents and creating a mechanism that will provide compensation to those who fill out the survey. *Warung* operators working with PT RUMA can also work as survey enumerators and are paid 500 rupiah (US\$0.05) worth of airtime for each person that they survey. Likewise, individuals can receive 500 rupiah (US\$0.05) worth of airtime for filling out the survey themselves. The problem remains however, as to how phone numbers can be collected to blast surveys too, and also how to ensure that survey recipients trust the application and feel that it is worth their time to respond. Moreover, if certain types of people are more likely to respond than others, this may also result in survey bias.

Until these issues are addressed, the Android survey application will be used as a tool for the Android user to more efficiently collect survey data as an enumerator. The Grameen Foundation, however, is not the only organization to develop a mobile phone survey for enumerators. An impressive variety of similar programs have been developed, some of which are limited to specific Java enabled phones and others of which can be used by a wide number of mobile phone models. Different types of software are being used as well, with some programs available for free and others paid. An example of one of these mobile phone survey applications is EpiSurveyor, which was first developed in Kenya as a mobile health survey tool but is now being used in different regions of the world and in different sectors to make the collection and transmission of data more efficient for enumerators.

V.

Migration and Labor in Indonesia

5.1. History of Internal Migration in Indonesia

While the use of ICTs in each of the sectors profiled in the above case studies provide valuable lessons and deserve further research and development, the rest of this paper will focus largely on the relationship between migration and the labor market in Indonesia and the role that ICTs have had—and have the potential to have—in assisting people in finding jobs in Indonesia. In order to understand the uses for ICTs in this manner, however, the history of migrant labor in Indonesia, as well as recent and current trends in the Indonesian labor market should be better understood. Of particular interest are internal migration patterns, issues of unemployment and also the relationship between agriculture and industrialization in the country, which is closely linked to rural-urban migration.

Both voluntary and forced migrations have long been a part of Indonesia's history. Certain ethnic groups have tended to be more mobile than others; specifically, the Minangkabau and Batak of Sumatra, the Bugis and Makassar of Sulawesi, the Banjarese in Kalimantan, and the Madurese in Java (Rogers, et. al. 2007). Among these ethnic

groups, migration has largely been voluntary and circulatory with migrants intending to eventually return to their original homes after earning additional money or otherwise gaining useful experiences. Some of these ethnic groups, such as the Bugis, have been migrating for centuries and continued to exhibit high migration rates in the 20th century as well (Tirtosudarmo 2009). Even prior to colonial rule, traders would also migrate and settle into port cities (Hugo 1980). Under colonial rule in the early 1900s, the Javanese and Sundanese were recruited to work on Dutch plantations outside of Java, while at the same time colonial activity on Java resulted in the formation of urban hubs such as Batavia (later known as Jakarta), Surabaya and Semarang (Tirtosudarmo 2009). Indonesians migrated to these urban hubs from rural areas and other islands for much the same reason that they migrate to them today—economic opportunities.

Following independence from colonial rule and Japanese occupation, the Indonesian government implemented a major transmigration policy from 1950-1998, which reflected earlier emigration programs implemented by the Dutch and Japanese as well. These policies largely aimed to alleviate overpopulation in densely populated areas and

further populate the other less populated islands of Indonesia—particularly in order to bring labor to resource rich areas where labor was lacking. The Dutch had encouraged emigration by providing farm laborers with monetary incentives and larger percentages of the profit if they left Java. In the 1970s and 1980s, the Indonesian government received support from the World Bank to implement multiple rounds of transmigration. In addition to the economic reasons for encouraging emigration that the Dutch had used, the Indonesian government also aimed to increase national unity and security through transmigration of various ethnic groups to other regions of the country.

Like the Dutch, the Indonesian government also used monetary rewards to encourage families to voluntarily emigrate from Java and Bali, though some emigrations were also forced. These policies resulted in large migrations of Javanese—and to a lesser extent Balinese—to Sumatra, Kalimantan, Sulawesi, Papua and other less densely populated islands (Rogers, et. al. 2007). By 1961, rural Sumatra, Kalimantan and Maluku had received the largest amount of external migrants. At the same time, rural to urban migration was increasing, particularly in Central Java and West Java. Improvement in the availability of education, health services, transportation infrastructure and communication facilities under Suharto in the 1970s also encouraged young people in rural areas to seek out opportunities in urban areas. These trends of urbanization could be seen not only as a result of Indonesians being motivated by economic opportunities, but also as a response to political insecurity in some rural parts of Java in the 1970s, as well as in Aceh and Maluku from 1995-2000 (Tirtosudarmo 2009).

Among the migrant workers of the 1970s, more than half were unmarried and most came directly out of school without prior work experience.

Workers migrating to Jakarta and other urban areas of Java generally had higher than average education levels for their hometowns. The opposite was true in Sumatra and other islands where the majority of migrants were unskilled workers who were moved as part of state sponsored transmigration programs or were attracted by opportunities in extractive industries such as oil and timber, or assembling and construction industries. From 1980-2000, most provinces that experienced net-emigration also suffered brain drain, while West Java instead gained human capital from immigrant populations. From 1990 onwards, Riau, Bali and Yogyakarta also experienced net immigration and increases in human capital (Tirtosudarmo 2009).

According to the 1971 census, 5% of the Indonesian population lived outside of their province of birth at that time (Rogers, et. al. 2007). Among the rural-to-urban migrants, two-thirds ended up in Jakarta and four-fifths of the migrants originated from other parts of Java. In addition to searching for jobs in urban hubs, migrants also found economic opportunities in other regions such as timber and oil industries in East Kalimantan (Sundrum 1976 referenced in Tirtosudarmo 2009). Rural to urban migrations have also been significant within Sumatra and within Sulawesi, though to a lesser extent. Moreover, the number of internal migrants was higher between 1985-1990 than it had been from 1975-1980 or 1980-1985. However, most of the migrations between 1985-1990 were likely voluntary as the Indonesian government was less capable of sponsoring transmigration after the price of oil crashed in the mid-1980s (Tirtosudarmo 2009). By 1995, the portion of Indonesians living outside of their province of birth had doubled to 10% (Rogers, et. al. 2007). However, the transmigration plans also led to social tension and outbreaks of violence between migrant and local populations, particularly in Eastern Indonesian provinces in



1995, in West Kalimantan in 1997, and in Central Kalimantan, Central Sulawesi and Maluku in 1998. Conflicts occurred over economic resources and also in response to resentment on the part of local ethnic groups towards forced assimilation and marginalization.

Since the transmigration largely came to an end with the Suharto era in 1998, migration patterns have shifted in direction. Indonesian out-migration from Java has drastically decreased while more and more Indonesian migrants head towards urban hubs, the largest of which are on Java—Indonesia's (and the world's) most densely populated island. In 2000, the population of Java made up 60% of Indonesia's population; though this showed a decrease from 74% of the population that resided on the island in 1971 (Tirtosudarmo 2009). Java is also home to the country's largest three cities: Jakarta, Surabaya and Bandung. Moreover, from 1975-2005, the human capital of Central Java increased by 5.2 years of schooling despite experiencing net emigration, partially due to circular migration that brought migrants from Central Java back home after working in Jakarta and West Java (Tirtosudarmo 2009).

In 1980, 22% of Indonesia's population lived in urban areas. By 2000, nearly 42% of the population had become urban (Rogers, et. al. 2007). Though the transmigration policy has come to an end, internal migration continues to increase as development leads to new opportunities in urban areas and advancements in technology and infrastructure make migrating easier. Largely due to Dutch emigration policies, and the Indonesian transmigration policy that followed, the Javanese now make up the largest ethnic group not only on Java but also in urban hubs in other provinces such as Lampung, South Sumatra, Jambi, North Sumatra and East Kalimantan (Tirtosudarmo 2009).

5.2. Impact of the 1998 Crisis on Migration and Labor

Among the economies of South-East Asia that were hit by the Asian Crisis of 1998, Indonesia appears to have had the most difficult time recovering, particularly in terms of unemployment rates. Inflation rose rapidly from 8% in 1996 to 61% in 1998. Meanwhile, economic growth fell from 8% to -14% from 1996 to 1997. The crisis also put an estimated 80 million Indonesians below the poverty line, increasing the national poverty level from 11% to 40%. In addition to facing an economic crisis, the country was also in the midst of a major political change as General Suharto's authoritarian regime came to an end and the "New Order" began.

In the 1990s, Indonesian workers in rural areas were rapidly shifting out of agriculture jobs into more productive and profitable manufacturing, trade and service jobs in towns and cities. However, after the crisis many workers shifted back to lower paying, less productive agriculture sector jobs or into transport or construction jobs (Manning 2010, 165). From 1961-1997, the percentage of the male workforce employed in agriculture had fallen from 74.2% to 40.1%, before jumping back up to 44.3% in 1998 (with similar patterns for women). Overall, the percentage of people aged 15 and older working in agriculture increased from 40.7% to 45% from 1997-1998. Meanwhile, the percentage of jobs in the manufacturing sector decreased from 12.9% to 11.3% (Hugo 2006). The number of new manufacturing jobs created a few years after the crisis had dropped to less than 3% of the number of new manufacturing jobs that had been created annually in the first half of the 1990s (Manning 2010, 164). The sectors of quarrying & mining, utilities, construction, trade, finance and services also experienced a drop in their shares

of total jobs worked by those aged 15 and older (Hugo 2006).

The crisis may have hit landless rural households particularly badly since prior to 1998, more than a quarter of rural households in Java were at least partially dependent on incomes earned by circulating migrant family members or by remittances from relatives working in urban areas. Java, was also particularly hard hit relative to other islands where foreign demand for cash crops and natural resource extraction activities remained higher than domestic demand. Areas of Java hit by El Niño induced droughts in 1997 were also worse off and impacted by the crisis (Hugo 2006).

As job creation has shifted back out of manufacturing and into agriculture, there has also been a trend away from formal sector jobs and towards more informal sector jobs in the post-crisis “New Order” period. Often the urban poor who were forced back to their rural communities found few opportunities for work at home and thus became undocumented seasonal or circular migrants searching out jobs in the informal sectors of cities. Unemployment also rose steadily after the economic crisis, hitting 10% in November 2005—higher than unemployment rates had previously ever reached in Indonesia’s history. At the same time, unemployment levels in other East Asian countries had relatively recovered (Manning 2010, 167). Trends in unemployment showed that in 2004, “just under half of all the unemployed were young, secondary educated people (mainly senior high graduates) aged 15-24, most of whom resided in urban areas” (Manning 2010, 167). Since formal sector jobs and jobs in manufacturing and trade were those most hard hit, it is not surprising that unemployment was higher in urban areas.

According to Chris Manning, reasons for the significant shift back towards informal and

agricultural sector jobs were linked not only to the poor economy, but also to government policies that made hiring employees more difficult for formal sector employers and also made foreign investment less desirable. While union and worker rights became a greater priority and better protected under the New Order, increased severance pay rates (by even international standards) and a dramatic increase in the minimum wages from 2000 to 2002 arguably may have made hiring more costly and less desirable or feasible among formal sector employers already hit by the poor economy. This may have also contributed to a shift towards a higher use of outsourcing among firms, in place of hiring fixed workers.

According to Manning, the Indonesian formal sector labor market is one of the most regulated among developing countries. The result, he argues has been that employment overall has been hurt. While the rights of formal sector workers may now be better protected, there are fewer formal sector jobs available and thus fewer opportunities for the unemployed and informal sector workers to enter the formal sector. At the same time, the investment climate in the post-crisis New Order has been less favorable, with longer approval processes, increased lack of transparency, illegal taxes and customs, and deteriorated infrastructure (Manning 2010, 168). Arguably, technological changes have also contributed to “jobless growth” and imports from lower cost producers such as China have also contributed to the current high unemployment levels.

Though jobs have in recent years been shifting back from the industrial sectors to agriculture, Ben White argues that the future of agriculture in Indonesia may also be in danger. While Manning believes that the shift back towards the agricultural sector is ultimately detrimental to

Indonesia's economy, White claims that small-scale agriculture is and may remain the biggest source of employment among developing countries. Though a large portion of young people in Indonesia are unemployed in the post-crisis period, White argues that youth in rural areas are also increasingly uninterested in working as small-scale farmers (2011). Thus on the one hand there are fewer jobs in the cities for young people, while on the other hand young people in rural areas are increasingly interested in finding jobs outside of the agricultural sector—the only sector, other than services, that is experiencing more growth now than in the 1990s.

White attributes disinterest in agriculture among youth on a global scale to the following factors: neglect of farming skills within the education of rural youth, negative social perceptions of rural life, government neglect towards developing rural and small scale agriculture infrastructure, corporate land grabbing, and limited access to land among youth. He further notes that a lack of access to quality communications infrastructure—namely mobile phones and social media—may also contribute to negative attitudes of rural lifestyles among youth (White 2011).

Tirtosudarmo (2009) further notes that while decreased availability of land could be offset by advancements in technology or increasing cultivation, the modernization of agricultural production in parts of rural java has led to greater unemployment.

Trends in both domestic and international migration, furthermore, are generally propelled by an unavailability of appropriate or desirable jobs at home, though in the case of rural youth a lack of access to farmland or the adoption of less labor intensive farming methods may also be a related factor. Migration in Indonesia, however, is often

cyclical or part-lifetime rather than permanent. According to White:

'Village' (and also 'farm') can become, for young people, the place where you grow up, which you will leave in search of urban employment, but where you may later leave your children in the care of their grandparents, and where you may later return to be a farmer yourself, when land becomes available and urban work has provided some capital for improvements (White 2011, 19).

This certainly appeared to often be the case in the predominantly rural district of Kebumen, where youth were often interested in searching for factory jobs in the cities but eventually envisioned themselves returning to their home villages to get married and have a family. Older villagers, particularly women, had often worked as *pembantu* (housekeepers) in cities at various points in their lives for months or years at a time.

In Indonesia, in 2007, nearly 7% of Indonesians that responded to the Indonesia Family Life Survey indicated that they were looking for work (sample size: 29,055). Among all survey respondents, 24.4% reported having responded to job adds and 20% indicated that they had contacted friends or family for job information. A smaller 9.5% indicated that they had registered with private job fairs, and only 2.6% indicated that they had directly contacted a company looking for job information.

How Indonesians find jobs also depends on the sector in which they work. For example, 52.4% of government workers found their jobs through government job fairs—though notably another 18.6% acquired government jobs through friends and relatives. The primary means of gaining employment was also through friends and relatives for both private sector workers (51%) and casual non-agriculture workers (65%). Being contacted by a company (employer) was the second most

common means of acquiring these jobs, and was also the primary method for casual agricultural workers to gain employment (48.5%), though nearly as many (45.6%) casual agricultural workers found jobs through friends and relatives (Strauss,

et. al. 2007). Private job fairs, school and university job fairs, responding to job adds and contacting companies directly appeared to be generally less used or less effective means of acquiring work.



VI.

ICTs, Jobs and Rural-Urban Migration in the District of Kebumen

6.1. Background

Building off of information about current trends in the uptake of ICTs in Indonesia, case studies of how the concept of ICT4D has been utilized in Indonesia, and a basic understanding of current trends in Indonesia's labor market, this study seeks to provide a better understanding of rural Indonesian perceptions of ICTs and their usefulness in areas such as acquiring relevant information about jobs. Rural regions of Indonesia in which domestic and international migration to larger cities are particularly common provide an interesting basis for examining ICT usage since job information generally has to travel large geographical distances and thus might benefit from improved access to more efficient methods of information transmission. One such region where migration is particularly common is the district of Kebumen in Central Java, Indonesia.

Though most of the population in the district of Kebumen resides in villages, mobile phone network coverage and Internet access rates are not necessarily representative of all of rural Indonesia. As mentioned earlier in this report, communications infrastructure is far more highly developed in Java and Bali than in the rest of

Indonesia. In fact, over 70% of Internet access in Indonesia (in terms of access per household) is concentrated in Java and Bali (Kominfo, 2010, 47 referenced in Nugroho 2011, 26).

Data collected by the Indonesian Bureau of Statistics (BPS) in 2010 found that 64% of households in Kebumen owned a mobile phone. Though a difference existed between urban and rural areas, it was not severe; 62% of rural households owned a mobile phone and 68% of urban families owned a mobile phone. At the same time, the gap between mobile phone ownership and ownership of other technologies was quite prominent. Among households in Kebumen, only 4% had a landline, 2.2% had a laptop and a mere 1.6% owned a desktop computer. This seems to be inline with findings that mobile phone uptake has expanded much more rapidly in developing countries than the uptake of far less affordable computers and laptops. It also shows that mobile phones have appeared to make landlines nearly obsolete in Kebumen, as in many households around the world.

Among households that owned mobile phones, the number of household members using a mobile phone tended to be nearly the same

as the number of mobile lines being used in the house. This seems to indicate that for the most part one mobile phone was not shared among multiple family members, but rather when multiple family members used a mobile phone they tended to each have their own. However, nearly 90% of households maintained no more than two mobile phones and did not have more than two household members using these lines.

Far fewer residents of Kebumen were found to use the Internet. In 2010, only 8% stated that they used the Internet, among which the majority (59%) were between the ages of 13-19. Among Internet users in Kebumen, 57% were still in school, 76% had not yet married, 37% were working and 7% were looking for work. Among these same Internet users, 65% had at least a high school level education. (See Appendix A for graphs depicting trends for Internet users compared with trends for the Kebumen district sample on the whole).

According to the BPS survey, Internet was accessed 54% of the time through *WarNet* (internet cafes), 40% of the time through schools and 39% of the time through mobile phones. Since most villages in Kebumen did not have *WarNet*, those who were using the *WarNet* to access the Internet likely either lived in the larger towns and cities or went to school in one of these towns or cities. Most villages only have a primary school and as a result most junior high and all high school students living in villages must commute to towns and cities to continue their education. It appears that Internet access in rural areas arrived almost exclusively through mobile phones—though at 39% of 8% of the population (3.1% of the population), mobile phones still didn't seem to provide much of the overall rural population with Internet access in 2010. As the author's research shows, however, these trends may have significantly changed in the two years since the survey was conducted and/

or the BPS survey may have underestimated the number of mobile Internet users in Kebumen.

In terms of occupations, the majority of Kebumen residents—as in most of Indonesia—work as farmers, fishermen or in other agricultural activities (40.2%). However, other significant means of deriving income also come from home industries (23%) and working at shops, stalls, restaurants, and in accommodation (15.5%). Job opportunities generally seemed to depend on geographical location (physical environmental factors that affected farming, fishing, etc.) and the level of urbanization (urban centers tended to have a larger variety of jobs—though not necessarily more job opportunities—than villages). As a result, villages that faced geographical constraints that limited incomes that could be gained through farming generally depended more highly on incomes gained by migrant workers.

In 2011, the Kebumen district *NakerTrans* office (Department of Manpower and Transmigration) received 14,586 job seekers for 4,324 job openings, 2,792 of which were ultimately filled. Of the jobs filled, at least 39% were in the province of Central Java (and an estimated 50% of those were outside of Kebumen district). Among the job placements filled in Central Java, most were for work in garment factories and retail stores. Among those jobs filled in Central Java but outside of the district of Kebumen, most were in the city of Semarang; though others were in Solo with some jobs in the batik industry. Job placements made within Kebumen district were all in the district center, the city of Kebumen.

At least 13% of jobs filled were International, and at least 27% were in other provinces of Indonesia. The last 21% constituted jobs that were filled through school partnerships with companies, or feeder-schools. These jobs could be filled on

the local, national or international level. As such, measuring the exact number of job placements filled that could be considered “migrant work” is difficult though it appears that at least half of these jobs were outside of Central Java and all were outside of rural Kebumen. Regardless, the migrant workers among the 2,792 recorded job placements appear to represent a small percentage of the overall number of residents of Kebumen who search for jobs outside of their hometowns—usually through more informal means.

According to Kebumen's BAPPEDA (Regional Body for Planning and Development), the majority of job seekers who come to their office seeking job information are young women who have recently graduated high school and not yet married. Aden Andrisusilo, Secretary of BAPPEDA, estimated that about 64% of job applicants were women. Ambang Sumirat of *NakerTrans* estimated that 60% were women. However, data recorded at the *NakerTrans* office showed that only 51% of job seekers were women. Most job seekers, were, however, high school graduates though many of the jobs available through *NakerTrans* did not

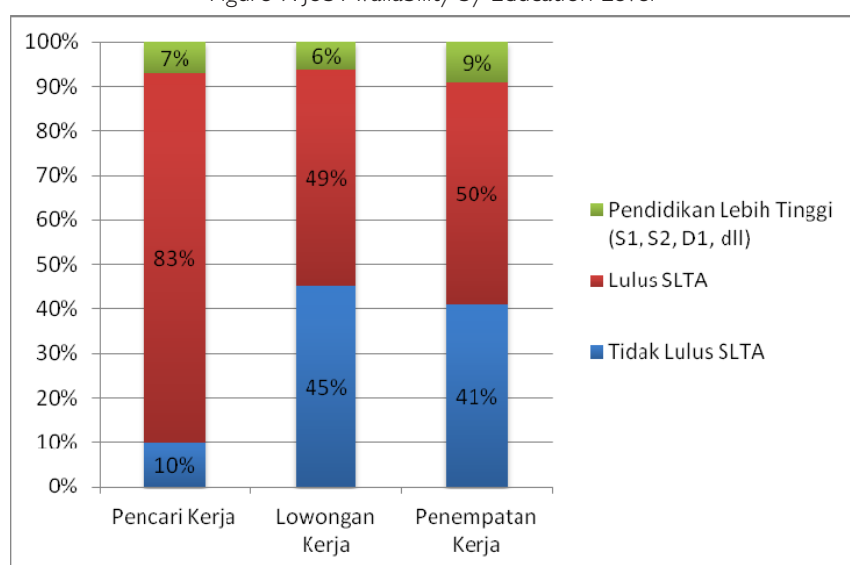
require a high school degree. This was particularly interesting since one reason that villagers claimed they did not use *NakerTrans* to search for jobs was that they believed that a high school degree was required for such jobs. Thus this perception may have originated from seeing that most job applicants were high school graduates rather than having actual information about the types of job openings available and for whom.

Andrisusilo noted that job information disbursed through *NakerTrans* and that comes from outside of Central Java, generally originates in Jakarta where a representative of the Central Java province *NakerTrans* office verifies job solicitations from businesses. All job solicitations are verified before being opened up by *NakerTrans* to job seekers in Kebumen. As job information comes in, it is posted online, and shared with the sub-district offices. (There is also a small online center for searching for jobs at the *NakerTrans* office in the city of Kebumen). These job announcements are posted in government offices, and according to Andrisusilo, each village head and village secretary brings the job announcements back to

their villages once a month and thus job announcements arrive at the village every two weeks, from the village head and then from the village secretary.

Andrisusilo stated that information took at most three days to travel from the sub-district office to each village. Andrisusilo also explained that job announcements are also delivered by letter or phone call from the sub-district office to the village heads. Once village heads had the information, they would

Figure 9: Job Availability by Education Level



(Source: Author's graph based on data from *NakerTrans*, Kebumen, Central Java)

post the information in the village government's hall and visit village groups such as *Pengajian* (Koran study groups) to relay the information received from the sub-district office to villagers. However, despite Andrisusilo's certainty that information about job openings was being effectively relayed to villagers, villagers in the three villages of Kebumen where research was conducted for this paper appeared to have received very little information about job announcements. Those who did recognize that job information was available noted that the jobs were too difficult to attain and thus not worth applying for (often partially because of ideas about education requirements).

For those who do show interest in job vacancies available through *NakerTrans*, they must first have a meeting with a *NakerTrans* official to discuss their interests, how *NakerTrans* can help, and to receive a *Kartu Mencari Kerja*, a yellow card indicating that they are looking for work. Factors that tend to affect job seekers interests in working in different locations include: ideas about salary, variety of job options available, and sometimes the distance from their hometowns. Most job seekers are interested in jobs working as factory operators. However, those who have only graduated elementary school or junior high school and who have farming experience tend to work on plantations in Kalimantan and Sulawesi, according to Ambang Sumirat from *NakerTrans*. Those working on plantations are about 60% of the domestic migrant jobs filled by *NakerTrans*, while the other 40% mostly goes to high school graduates working in factories in Bandung and Jakarta. Contracts for plantation work generally lasted 3 years, while factory contracts lasted 1-2 years.

According to Sumirat, many factory workers renew their contracts and after completing their second contract with a factory were able to

become permanent workers. Anecdotal evidence from discussions with villagers revealed, however, that those who had worked in factories often found it impossible to renew contracts since factories were strict about age limits, preferring those not yet in their mid-20s to maximize productivity. This is also inline with Tjandraningsih, et. al's findings, which showed that employment discrimination exists within the Indonesian metal industry against short-term contract workers outside of the 18-24 year age range (2010, 76).

Other times, villages disliked the factories where they worked or missed their families in their hometowns. Sumirat also surmised that those who became permanent workers then looked for spouses and that only 15% of job seekers looking for work within Indonesia through *NakerTrans* were already married. However, among villagers spoken to over the course of the research conducted for this paper it many believed that most migrant workers eventually returned to their home villages to settle down and it also appeared that some villagers continued to search for work outside of their villages even after being married and having families.

Though the *NakerTrans* office statistics show that 45% of job vacancies filed through their office do not require a high school diploma, Andrisusilo explained that jobs in the cities mostly required completion of high school. For junior high graduates wanting to work in factories, however, *NakerTrans* provides 1-2 month skill trainings that would qualify them for these jobs. Those with a high school degree also receive a training of 1-2 weeks prior to starting factory jobs in Jakarta or Bandung. Most domestic migrant workers head to Jakarta or Bandung, though some also went to Semarang, Surabaya and Jogjakarta (all cities on the island of Java). In Andrisusilo's perception, among all migrant workers that stay in Indonesia (including

those not finding work through the government office), only 2-3% left the island of Java. However, many domestic male migrant workers who found jobs through *NakerTrans* ended up working on coco, coffee, or coconut plantations on the islands of Sulawesi and Sumatra. Most domestic female workers that do not work in garment factories, Andrisusilo believed, work as *pembantu* (house keepers) in Bandung.

Among all migrant workers from Kebumen, regardless of the jobs they worked, Sumirat believed most sent back money from their savings to parents and to younger siblings to help them through school. Anecdotal information from villagers seemed to support this claim, though a number of villagers who had tried to send money back home found it difficult due to low wages and high costs of living in the cities. Among international migrant workers, wages varied considerably with the difference between wages in Malaysia and Indonesia sometimes being negligible and wages in Taiwan and Hong Kong generally being considerably higher—though relatively few international migrants seemed to work outside of Malaysia and Singapore.

As of yet, no specific information has been collected on the number of informal migrant workers (those that do not go through *NakerTrans*) from the district of Kebumen or on how they find jobs, where they work or for how long. One NGO working with international migrant workers, Pakubumi, in the sub-district of Ayah estimated that there were 1,000 people from the 18 villages in the Ayah sub-district that were currently working abroad. This is more than twice the number of international migrants in all of Kebumen's 26 sub-districts that received international work through *NakerTrans*. Pakubumi's work however was limited to one sub-district and only focused on international migrants. As such, they are unable

to provide a clear picture of international and domestic migration trends from the district of Kebumen on the whole.

One of the most active NGOs in Kebumen, FORMASI, works with villages throughout the district on local government policies, budgeting and creating forums on issues such as women's rights, poverty, etc. According to FORMASI, the majority of workers in Kebumen work as farmers and specifically, agricultural laborers but many work side jobs in construction or small-scale trade. Many men also left the villages, between jobs, to look for work in construction. For women without any high school education, many would leave the villages to work as *pembantu* (housekeepers) in urban homes. For increasing numbers of both young men and women graduating from high school, however, jobs in urban factories are now the most sought after. Yusuf Murtiono, the director of FORMASI, believes that migration to cities for work happens most often in villages in the mountains and in the coastal areas of Kebumen. He estimated that in these areas, as many as 40% of residents from a village may migrate to urban areas to find jobs, with numbers particularly high among youth.

Murtiono's perception of labor and migrant work in Kebumen is based on FORMASI's knowledge from working with village governments and communities throughout the district. No data, however, has been specifically collected on these migrant workers by FORMASI or by any other known entity. Each village government keeps a record of the village's infrastructure and its population in terms of demographic information including livelihoods organized by sector. However, these village profiles, based off of a national model, do not differentiate between villagers living in the village and those who grew up in the village but currently work elsewhere.

In order to gain a better understanding of how and why migrant workers in these villages find jobs in urban centers, research was conducted in three villages that FORMASI perceived as having high numbers of migrant workers but that also differ from each other geographically and in terms of the diversity of livelihoods available. The three villages chosen were Langse, Karanggadung and Pasir. Relevant information collected on the three villages from village government profiles can be found below:

school. Additionally, Langse had the highest percentage of full time workers among residents aged 15-55. The most common job in the village was “farm laborer” and unlike in the other two villages visited, there were more farm laborers in Langse than farmers. In other words, the majority of those working on farms did not own the land they worked on and likely had irregular incomes that fluctuated based on the season. The village government and FORMASI further explained that because of the mountainous geography, farmland

Table 5: Overview of Sample Villages in Kebumen District

	Langse	Karanggadung	Pasir
Mountainous	Yes	No	Yes
Coastal	No	Yes	Yes
Population	3,664	2,588	2,826
Age 15-30 (age group surveyed)	828	555	798
Age 15-19 (high school age)	254	176	285
Age 7-45, never been to school	102	1	43
Age 7-15, not currently in school	22	0	0
Age 15-55 still in school	21 (1%)	246 (19%)	219/735*
Age 15-55 working full time	789 (47%)	407 (31%)	237 (14%)
Age 15-55 working part time	367 (22%)	935 (26%)	345 (21%)
Higher education (college level)	10	6	45*
WarNet/ Post Office	None	None	None

* Conflicting data appeared in Pasir village’s government profile making it difficult to gauge the number of residents aged 15-55 still in school and the number of residents who continued their education after high school.

(Source: Village Governments of Langse, Karanggadung and Pasir)

6.2. Information Access and Usage in the Sample Villages

6.2.1. LANGSE

Among the three villages, Langse was the only village to record having children ages 7-15 not in school and also had the largest percentage of residents aged 7-45 who had never attended

was of a lower quality than in other parts of the district. Output and the variety of crops produced were thus greatly limited by geography. Villagers in Langse, unlike those in Karanggadung and Pasir, felt that a family whose income came from farming alone would not be able to afford to pay their children’s school fees. Villagers in Langse also explained that very few jobs outside of farming existed in Langse and thus almost all young people left the villages after completing school in order



to find work that would be able to pay for their younger siblings' school fees.

The extent to which leaving the village in search of work was prevalent in Langse was made particularly clear through the existing shuttle service that provided door to door transportation from the village to Bandung and Jakarta. These services started in 2002 with a couple of drivers using personal cars to meet the transportation needs of villagers searching for work as *pembantu* or construction workers in Jakarta and Bandung. By 2006, more cars and drivers started to operate in the village and there are now 6 of these shuttle cars, called "travels," that depart from Langse twice per week at 3pm or 4pm. After the *travel* leaves Langse it stops in a few other villages and then in the city of Kebumen around 6pm, from where it is usually at least another 12 hours before the passengers arrive in Jakarta. The *travel* will generally take a minimum of 7 people and can fit up to 14. In 2003, a ride to Jakarta in a *travel* cost 25,000 rupiah (USD \$2.50). Today that same ride costs 120,000 rupiah (USD \$12), which is more than the 30,000 rupiah (US \$3) economy class train ticket. However because the *travel* offers door-to-door service and the passengers are often those who have not traveled far from home before they are willing to pay more for the convenience and sense of safety. Often, passengers choose a driver based on whether they themselves or a friend knows the driver personally. The driver, as a result, usually knows all of his passengers or has some established social bond with them through friends or relatives.

Despite being idealized as safe (at least emotionally), the *travels* are notorious for getting into accidents with at least one accident occurring almost every year. Last year, six people from the village died in a car crash on the toll road near Jakarta. Though people in the village were initially

scared by the news, they soon resumed their usual usage of the *travel* services. The accidents tend to happen early in the morning and particularly around the holiday of *Lebaran* (Eid vacation) when millions of Indonesians head back to their home villages from Jakarta and Bandung.

The introduction of the mobile phone has played a significant role in the evolution of these *travel* services over the past 10 years, according to Sarno who worked as a driver from 2002-2008 and now rents out two cars to other drivers in the village. In 2003, there were no door to door services and passengers had to make appointments beforehand with their friends or relatives in Jakarta to specify where they should meet. The *travel* would only drop off at 2 or 3 places in Jakarta. Once the driver arrived in Jakarta he would sleep at a friends place until he could find enough people to fill the car and go back to Langse. They also used a smaller car then.

As of 2008, almost all passengers and the driver have their own mobile phones, which they bring with them in the *travel*. Passengers often text with their relatives and/or friends in the cities and often get the address where they want to be dropped off this way. Once they arrive in Bandung or Jakarta, the driver will often talk to the relative or friend on the phone to get directions to their home. The *travel* is now used to transport other things such as packets of money, or even TV sets and motorbikes. For packets of money over 1,000,000 rupiah (US \$100), the driver charges between 50,000 (US \$5) and 100,000 (US \$10) to transport the money. However, for amounts of money less than 1,000,000 rupiah the transaction is more casual and the amount paid to the driver is left to the discretion of the person sending the money. A large TV may cost the price of two passenger tickets if it takes up two seats and motorbike costs 300,000 (US \$30) to send via *travel*. Generally

these transactions are a form of remittances sent from the city back to families in the village.

In Langse, four Focus Group Discussions (FGDs) were held with a *Pengajian* (Koran study group), PKK (Family Welfare Program) group members, village leadership, and three young men currently looking for jobs. Perceptions about ICT usage in the village varied greatly within and among these groups. Among the 18 *Pengajian* members, the majority of the members were elderly though they ranged in age from 30 to 70+ and they were all women save for three. Of these 18, fourteen had either themselves worked outside of the village or had children who were currently or had previously worked outside of the village. The four others were women between the ages of 30-39 who worked as farmers. The three men had all worked as seasonal construction workers and would travel to other villages or the city of Kebumen when such work came up. The youngest of the remaining eleven women was 43 years old and all of these eleven women had children who had worked outside of Central Java, mostly in Jakarta and/or Bandung. Most of the sons worked in construction or in factories. A few of the daughters also worked in factories or in stores. However, most of the daughters worked as *pembantu* (housekeepers) or had become housewives after marrying husbands who worked in the cities.

Since the members of the *Pengajian* were mostly elderly women, they were unsurprisingly the least accustomed to using ICTs of the Langse groups involved in the research. The older women themselves mostly had mobile phones that their children had bought for them or borrowed a mobile phone from a neighbor when they wanted to call children who lived outside of the village. If they borrowed the mobile phone they would pay the neighbor for the airtime used. The perception of the *Pengajian* members was that children

usually acquired mobile phones while in junior high school, around the age of 13. Sometimes their parents bought these mobile phones for them, but often older siblings or other family members bought them. Junior high and high school students would use the mobile phones both to send SMS texts and make direct calls. The general perception was that junior high students did not have Internet access through their mobile phones but that high school students often did though they only used this Internet access to use Facebook. Additionally, villagers looking for work would call family members in Jakarta and Bandung to find out about job opportunities.

Among the PKK members (who ranged from age 26 to 60), two used their children's mobile phones while the other nine owned their own. Children who used mobile phones would pay for their own airtime and often access the Internet. However, the mothers generally only used their mobile phones to receive calls and text messages from family.

One young male PKK member also talked about trust issues associated with mobile phones and the Internet. Every year, he believed he received approximately ten texts with false advertisements. Though he had never responded to these texts he mentioned that his friends had responded to similar texts and had airtime subtracted from their mobile phones as a result. In his opinion, this problem was not associated with any one MNO in particular as all of them had these problems. In general he would just delete texts from numbers that were unknown to him. He noted that a mobile phone account owner would be charged just to receive a text and that sometimes one could unsubscribe from these texts but other times it was not possible. As for the Internet, he stated that there were often false advertisements on Google but that this had not yet become an issue with Facebook.



The members of the village leadership, who generally appeared to be more privileged than the average village resident, held the perception that everyone in the village owned a mobile phone. They noted that one household alone might have four mobile phones as almost all family members would have their own mobile phone to talk with others outside of the village. Considering the responses from the previous two focus groups, it seems that the perception of the village leadership may have been somewhat biased and exaggerated. They all agreed that all households had multiple mobile phone lines, even though the network signals were sometimes very weak. They also believed that somewhere between 25% and 50% of youth accessed the Internet through their phones and that almost all of those who were students had Internet access. They believed however that many of the parents did not know about their children's Internet usage, which potentially could explain why few members of the *Pengajian* group talked about their children using the Internet. One mother from the village leadership also noted that while her children could access the Internet on their mobile phones she herself did not know how to do this.

Two men, Misno (47 years old) and Arifin (23 years old), both spoke more in depth about their Internet usage. Misno began using Facebook in 2010. Before then there was no telecommunications tower in Langse so the signal was very slow. Misno makes use of a daily social media packet subscribed to through his mobile phone to enable him to check Facebook every night. Arifin, who has a degree in English and Education and teaches in Kebumen, explained that he uses Facebook, Twitter, YouTube, and instant messenger services through his mobile phone. He used both Facebook and his mobile phone number to keep in touch with friends in both Kebumen and Langse. He has an e-mail account but does not use it, and explained that only college students

use e-mail. (This statement seems to support the findings in Table 2: Top 5 activities conducted on a weekly basis by digital consumers 15+).

Arifin also accessed Internet through a Telkomsel modem for his computer, for which he pays 50,000 (US\$5) per month. However he noted that he used the Internet more often through his mobile phone and used Facebook to message his friends more often than he used SMS texts because Facebook was cheaper. Arifin said he used Facebook every day when he had time to and only used the social network to chat and not to look up any type of information. He did however occasionally use Google's search function to look for information. While Arifin mentioned using Twitter, most of those interviewed in Kebumen district did not appear to use this service and overall Facebook appeared to be more popular.

Misno also spoke about the availability of other types of communication services in Langse. He noted that almost every house had a television set but that now radio is rare. Whereas radio used to be more common, the same radio services can now be accessed through the mobile phone and music can be accessed even without Internet access. He further explained that for those who had a television, radio was no longer necessary. As for newspapers, even though the Central Java newspaper *Koran Suara Merdeka* was accessible in the village it was rarely read by villagers and only subscribed to by government offices and schools. Billboards were also only used at school for providing education information to students and teachers.

Lastly, among the three young men looking for work (ages 19, 21 and 25), all had already owned their own mobile phones for 3-4 years. None of them however knew how to use the Internet through their mobile phones. Only the

19 year old, who was about to graduate from high school, had ever used the Internet. He had used the Internet to access Facebook at WarNet. He had also used the Internet to look up information about jobs. In addition to searching for information via Google, he had looked up the websites of automotive plants/ businesses to see if any had job listings. So far he has yet to find any job listings on these sites. He only uses Facebook for social purposes, and has yet to use the Internet in any other ways than those that he described. He believed that many of his friends, or at least 25%, had Internet access through their mobile phones. All three of the young men believed that all of their friends had their own mobile phones but were less sure about the percentage with Internet access. Notably, the other two young men who had never used the Internet also did not continue on to high school after completing junior high school.

The three men also talked about trust issues with mobile phones. One noted that in a single day he might receive four scam text messages on his phone but that he does not read them. Another young man said that he received them about four times a month and the last man said that he received such messages only about twice a month. None of them ever read or responded to these messages. They were concerned that if they responded to these text messages airtime would be subtracted from their mobile phones, as they had heard had happened before to their friends. The information source that they perceived as most trustworthy was their friends, and they usually received information from friends through their mobile phones. Still they noted that they might be interested in receiving job information via mobile phone or through Facebook, particularly if FORMASI—the local NGO, which they trusted—provided the information.

Though none of these three young men used Internet through their mobile phones, another young man from Langse who was interviewed made extensive use of mobile Internet. Imam, who was 22 and a high school graduate, started using Internet through his mobile phone when he moved to Jakarta after school to work in a Yamaha factory. After renewing his one-year contract for a second year, he was unable to renew the contract again despite wanting to continue to work in Jakarta. (He noted that those who were able to stay at the factory as permanent workers were only able to do so through nepotism). After his second contract ended, he used savings from his work to stay with friends in Jakarta for another five months while he looked for a new job. During those five months he used both Google and Facebook to look up job information. For both websites, he used the search function to look up “*lowongan pekerjaan*” (“job opening”). When logged into Facebook, searching for this phrase would sometimes bring up Facebook pages of businesses or information about jobs that his Facebook friends had posted. Though Imam at times would search for job information this way on a daily basis, none of the information he found led to his securing a job in Jakarta. He noted that many of his friends also looked for job information that way but he was unsure if any had ever succeeded. After five months, he returned back to Langse and eventually after another six months at home he found a job in cleaning services at a hospital in the city of Kebumen through his cousin.

Imam explained that initially when he began using the Internet through his mobile phone in Jakarta it was still very expensive and so he used it “rarely.” By rarely, he meant about ten times per week. Now that he is on a monthly payment plan, however, he accesses Internet on his phone multiple times per day. The plan usually costs 20,000 rupiah (US\$2) per month but Imam managed to find a way to get onto a student plan that costs only



10,000 rupiah per month (US\$1). Though he now has open access to all Internet, he only makes use of Facebook and Google, using both about evenly. He sometime also uses his cousin's laptop to access Internet. Now he uses Facebook to chat with his friends in Langse, in Kebumen and in Jakarta. He noted that many of his friends in Langse also had Internet access through their mobile phones. Most of his friends in Kebumen and Jakarta used mobile Internet as well, though some of his friends used to access Internet. He claimed that none of his friends were without Internet access. He also felt that if a Facebook page based work information site existed he and his friends would be interested in using it.

6.2.2. KARANGGADUNG

Unlike Langse, Karanggadung is a coastal village, however only a small portion of residents works as fishermen. Though the beach in Karanggadung has not attracted many fishermen, it had been developed into a local tourist destination that is crowded on weekend mornings, and which provides some additional income to the village and has created jobs for villagers. Overall, economically, Karanggadung appears to be better off than Langse though not as well off as Pasir. Though villagers felt that school fees could be paid through local jobs, the majority of young residents still seemed to leave the village and become migrant workers at least temporarily.

In Karanggadung, three Focus Group Discussions (FGDs) were held with the village leadership and government, a group of men and women who had previously worked as migrant workers, and a group of six young men who were looking for work. Due to time constraints ICTs were not discussed in depth with the village leadership though they noted that most youth had their own mobile phones before completing

school and leaving the village to look for work.

Among the returned migrant workers, the general perception seemed to be that about 70%-80% of the villagers owned their own mobile phone. In terms of Internet, the perception was that mostly young people/students and men used the Internet but that Internet usage was very rare among older women. (Two of the nine men in the group stated that they used the Internet through their mobile phones). For those who did use the Internet, access was more often through mobile phones as the nearest *WarNet* was in the sub-district center, which was far from the village. Everyone also seemed to agree that SMS scams were common (generally received once per month) and that responding to some messages would result in airtime being subtracted from one's mobile phone.

In the final FGD, the six young men who partook ranged in age from 23 to 34. Half had graduated high school and the other half did not continue past junior high school. All of them owned their own mobile phone. When first asked if they used Internet, initially all said they did not. However, towards the end of the 90 minute discussion, it was revealed that four had used Facebook through their mobile phones and one had used a chat service called "Nimbus" through his mobile phone. Therefore, in reality, only one of the participants had never used the Internet. The youngest participant accessed Facebook daily, while the other three Facebook users claimed to use the service "once or twice monthly," "a few times annually," or "not often." For those who did not use Facebook very often, they said their main use for the service was to stay in touch with friends working abroad in countries like Malaysia. This was because paying for mobile Internet to send a message via Facebook was cheaper than paying international SMS rates. Some also used

Facebook to chat with friends. When asked why they had all earlier said that they did not use the Internet, they responded that they did not think that occasional Facebook use qualified as “Internet use.” None of them had used any other Internet services outside of Facebook and Nimbus.

Like the village leadership, the young men guessed that about 80% of the villagers had a mobile phone. They noted that there were also those who used the Internet through their mobile phones but that for the most part mobile phones were used to send SMS messages and make calls. They also noted that mobile phones were also widely used to gain information about jobs, but generally only from friends and family. If they were to receive information from people that they did not already know they would be worried about fees and scams.

In addition to the three FGDs, two young women looking for work were interviewed. The first, Yanti, was 21 years old, and had recently come back to the village after working in Jakarta and Bandung for three years after she had completed junior high school. Yanti had found her first job at a *warung* (food stall) in Jakarta through a friend who was already working there. After a year, however, she was tired of working in Jakarta and thought she might prefer Bandung. However, she did not know anyone in Bandung and thus began looking for jobs in Bandung by searching for job openings through Google, which she accessed at a *WarNet*. She continued to search for job information this way during her off hours from her Jakarta job and eventually after a month succeeded in finding a job in another *warung* in Bandung where she stayed for two years before returning to Karanggadung. She said that now she uses the Internet via her mobile phone at most once per month, and sometimes through a *WarNet*. When she uses Internet, she either uses Facebook for social purposes or uses

Google to look for work information. She said, however, that most of her friends rarely use the Internet. She hopes to find a new job in Bandung but would like to work in a factory rather than at another *warung*.

The second woman, Selfi, was 18 years old and completing her final year of high school. She said that she was able to use the Internet for free at her school, but that she also accessed Internet daily through her mobile phone. She would mostly use the Internet to check her Facebook account, but sometimes also used Google to search for information for her schoolwork. Though she was beginning to look for jobs, thus far she was relying on her school to provide connections to factory jobs. She had not yet used the Internet to look for job information though she conceded that getting a factory job through the school system was very competitive and that she had not yet thought of a backup plan if she did not pass the qualifying tests.

In addition to the interview with the two young women, another interview was conducted with a man who had established a popular Facebook page that was used by residents of Karanggadung, and particularly those working outside of the village.

Sugiatmoko was 28 years old and himself a returned migrant worker having previously worked in security at banks in Surabaya for four years and also in Jakarta. He and a few friends from Karanggadung first created the Facebook Group, “PWKB” (*Paguyuban Warga Karanggadung Bersatu*, or “Karanggadung Residents Unite”), in 2009. From the start, the PWKB group page was a “closed group” meaning that in order to become a member and access information posted on the group wall a Facebook user had to be approved (and verified as a resident of Karanggadung) by Sugiatmoko or one of the other original creators

of the PWKB Facebook group. The purpose of the Facebook group was to keep in touch with and strengthen the sense of community among people from the village, many of who were now working outside of Karanggadung. Originally there were six members in the group, but now there are 210. All members are people who grew up

village members is strong enough that they feel comfortable depositing their own money into his account and trust that he will use it for the stated aims. On two occasions, t-shirts have been made and sold to members for 50,000 rupiah (US\$5) each as a means of raising funds for the elderly and orphans. In doing this they have been able to

Figure 10: PWKB Facebook Group



(Source: Facebook.com)

in Karanggadung and include both domestic and international migrant workers, in addition to school students and other current village residents.

According to Sugiatmoko, the PWKB Facebook group page is used to organize social events and to collect donations that go towards the elderly and orphans living in Kebumen. In order to collect these donations, a committee was formed with a treasurer and the bank account number used to receive funds was posted on the Facebook group's page. Though Sugiatmoko would like to register PWKB as a NGO so that the organization could sign up for its own bank account, he has had difficulty in achieving this and thus his account is now being used to collect funds. This seems to show that trust among

raise millions of rupiah (hundreds of dollars). The PWKB Facebook group also share's information about its fund raising activities with the village government and youth groups.

The PWKB Facebook group also serves as a means of creating satellite networks. Communities have formed among Karanggadung people living and working in Bandung, Cikarang and Jakarta who, prior to joining the Facebook group PWKB, had not met each other. Now members from each of these cities use the Facebook group to arrange meetings with each other, often monthly. The Facebook group founders also organize annual social get-to-know-each-other gatherings at the village government hall during Eid, when migrant worker return to the village for the holidays.

Figure 11: PWKB T-Shirts for Sale



(Source: Author's photo)

Stickers with the PWKB logo have also been made and are given out as a means for raising awareness about the group.

On one occasion, thus far, the Facebook page has even been used to provide job information. A student from Karanggadung who was about to graduate posted on the group's page asking if anyone knew of any job openings. Another member of the Facebook group then posted information about a job that was available as a Sales Marketing Girl. In this manner, the Facebook page helped the job seeker find a job. On another occasion, a young woman returning from working in Brunei DarEl Salaam used the Facebook page to ask for a ride from the airport. Sugiatmoko offered to pick her up even though he had never met her before. When she arrived at the airport her mobile phone number was not

working but she had Internet and was thus able to receive a message from Sugiatmoko via Facebook stating where he was standing and that he was wearing a red shirt. Sugiatmoko's friends laughed while Sugiatmoko told this story and implied that Sugiatmoko was happy to pick up the young woman because it was an opportunity to meet a young woman from the village and he was still looking for a wife. Whether or not this was the case, the story shows the potential for the Facebook group to provide a culturally appropriate way for women and men from the village

to become better acquainted with each other.

Sugiatmoko mentioned that at some point in the second year that the Facebook group was in operation, an unknown user managed to hack into the Facebook group and post spam on the PWKB wall, even though he was not a member of the group. Sugiatmoko and his friends were

Figure 11: PWKB Sticker



(Source: Author's photos)

not able to figure out how this spammer was able to access the group's page. However, instead of trying to contact Facebook to block the spammer, Sugiatmoko decided to create a new Facebook page for the group, invite all the old members to it, and stop using the old Facebook group page.

In addition to using Facebook as a means of sharing information with the village, Sugiatmoko also has plans to set up a local radio station in order to provide relevant information to villagers and particularly those without access to Facebook. Older folks, in particular, might not use mobile phones or have Internet access. Sugiatmoko mentioned that other villages in the district of Kebumen have local radio stations but that he has found it difficult to acquire the necessary license to run a station in Karanggadung. Most of the radio stations available for Karanggadung residents to listen to are from the city of Kebumen. These stations sometimes advertise jobs but the residents of Karanggadung rarely respond to these adverts because they believe that getting a job in the city of Kebumen is too difficult. The general perception is that there are not many jobs in the city of Kebumen but many people are looking for jobs there.

In addition to the FGDs and interviews conducted in Karanggadung, a survey of 33 youth aged 15-30 was organized with the help of the village government and using the mobile phone enabled application EpiSurveyor. (The survey questions asked can be found in Appendix B). According to the village government, these 33 individuals represented over 90% of all the 15-30 year olds still living in the village; they believed only 3-4 people were missing due to them being at school or farming when we stopped by their homes. Since the village profile stated that there was 555 people currently aged 15-30 from the

village, this would mean that over 99% of all youth aged 15-30 currently lived outside of the village. It seems likely that the village government underestimated the number of villagers aged 15-30 that had not been surveyed but if so, by how much is unclear.

Among the 33 youth that were surveyed, 76% had accessed Internet through their mobile phones, 21% had a mobile phone but had not used mobile Internet, and only one person (3%) did not have their own mobile phone. Of those surveyed, many seemed unsure at first as to whether they had used Internet via their mobile phone until it was clarified that Facebook was an example of an Internet application. Most who did use the Internet through their mobile phones predominantly used Facebook, though a few used Google. Parents did not seem to always have a clear perception of their children's Internet usage. For example one woman said that her daughter only used the Internet at school, though the daughter later revealed through the survey that she did in fact access the Internet through her mobile phone.

6.2.3. PASIR

The village of Pasir appeared to be the best off economically of the three villages where research was conducted in the district of Kebumen. According to the village government and other villagers spoken with, most families had multiple sources of income usually between fishing, farming and livestock. Pasir also had the highest proportion of farmers to farm laborers with nearly 3 farmers for each farm laborer. More villagers made their main income from fishing however with 548 villagers (29% of the workforce) working as fishermen. Karanggadung, in comparison, had a smaller number of fishermen and a smaller workforce, with only 30 villagers (3% of the workforce) working as fishermen. Fishing in Pasir, moreover, had become

an increasingly popular income source after the introduction of motorized boats in the 1980s made fishing a safer and more productive job. Though no official data existed with relation to the number of migrant workers from Pasir, the general perception of the village government and other village elders seemed to be that only a small percentage of village residents left the village to look for work since work was relatively plentiful in the village. Among the youth, however, a large portion seemed to still be interested in working outside of the village or already had some (if even only for a couple weeks or months) experience working in cities.

In Pasir, three Focus Group Discussions were conducted with the village government, mothers from the *Pengajian* (Koran study group), and unemployed youth looking for work. Interviews were also conducted with the village head, a fisherman who had used mobile phones to assist him in finding fishing work outside of Pasir during low seasons, the head of the local village IPNU (Nahdlatul Ulama Muslim Organization) chapter, the head of the village *Karang Taruna* (youth group), and a village government officer interested in the use of the Internet to improve Pasir's infrastructure's structural design. As in Karaggadung, a survey of village youth was also conducted in Pasir. However, because it appeared that a far larger percentage of youth aged 15-30 still lived in the village, the survey was largely limited to one neighborhood that was believed to be socio-economically representative of the village, in an attempt to get a less biased sample. In total, 49 youth were surveyed from Pasir with 31 coming from the same neighborhood unit, RT02, RW02. According to the village government, the 31 youth surveyed represented 75% of all the

youth living in that neighborhood unit.⁴

According to the village head in Pasir, television sets have been in the village since 1980 and now nearly every family owns a television. Satellite connections were introduced ten years ago. He guessed that for each neighborhood unit (RT), at most two homes were without a television set. Television is generally used for entertainment and to access national news and other types of information. Radio usage has declined and is now largely focused among the elderly, who use the radio to listen to *wayang* performances and national and regional news. Among the youth, the radio is predominantly used to listen to music. Few people in the village read the newspaper, outside of those with high education and teachers. Moreover, since the newspapers have to be bought from outside the village by the time they get to the village the news is often old and has already been accessed via the television, which serves as a faster medium for providing information. Additionally, the village government does make use of billboards to disperse information about government policies, health information, and job opportunities provided through *NakerTrans* or directly from companies.

Mobile phones were introduced to the village in the early 2000s. Now almost every family has a mobile phone and mobile phones were most used among young people, aged 15-35. The village head believed that most villagers aged 45 or older did not use mobile phones. Internet access is much more recent, having begun to spread through Pasir only in the past three years. The village head believed that Internet access was mostly limited to young people and estimated that about 70% of

4 RT02, RW02 is one neighborhood out of 13 in Pasir, and was believed to have roughly the same number of fishermen, farmers and migrant workers as most other neighborhoods in Pasir. Of the 13 recorded neighborhood units, two outlier neighborhood units existed according to the village government—one of which was relatively more wealthy and well educated and one of which was made up almost completely of coconut farmers and thus less wealthy than the other neighborhoods.

those aged 15-25 used the internet either through their mobile phones or at a *WarNet* (though there was no *WarNet* in the village). He noted that Internet access through mobile phones was rapidly expanding and that perhaps in two years all homes would have access to Internet.

Generally, for information about jobs within the village, residents depend on information from friends or follow up with flyers posted by companies that go around the town in a car to advertise their jobs. The companies that post such flyers are usually new large companies or factories either from within or outside of the district of Kebumen. Usually in one year they will come through 5 to 6 times. Those who search for jobs through the Internet via a mobile phone or a *WarNet* are more likely to be young people. Others might find jobs through the newspaper or intern with a friend. Among those searching for work outside of the village, those who use agents are generally looking for work in factories while those who find jobs through friends often work as housekeepers. Some find factory jobs through school while a few also utilize *NakerTrans*. In the village head's opinion, it was quite easy for the residents of Pasir to find work. Among the thirteen members of the village government, aged 35-53 (two women and nine men), four had previously worked outside of the village and found those jobs through information received from friends.

Among the twenty female *Pengajian* members (age 31-56) in the focus group, fourteen had children who had worked outside of the village and/or had themselves worked outside of the village. Three of the women had previously worked as babysitters or housekeepers in Bandung and Jakarta and had acquired these jobs through agents who had come to the village or in the case of the babysitter, the agent was sought out in the nearby city of Gombong. Six of the

women had children who had acquired jobs at factories or as housekeepers through information acquired from friends, neighbors or relatives. One woman's son heard about work in Taiwan through his fishermen cooperative and applied to work abroad through a PJTKI (Indonesian International Migrant Worker Company) agent. Another woman's son followed a relative to another city and then looked for job openings in the newspaper. Additionally, the children of three of the women found jobs in factories through their schools. Among those that found jobs through friends, relatives or neighbors, the information was acquired in person at times but in other cases through phone calls and even text messages.

According to the *Pengajian* members, the increased usage of mobile phones has made looking for job information easier. They also noted that some youth had begun looking for job information through the Internet and that though not all of them had been successful the attempts were being made. The *Pengajian* members, all of whom were mothers, estimated that among the mothers in the village 70% had their own mobile phones while the other 30% did not. They also believed that all high school aged youth now had their own mobile phones, though not all had Internet access. Usually the mobile phones are used to text (SMS) or make calls with relatives and friends, and mostly with those living outside of the village. Most of these young people use their mobile phones every day, usually to send texts (SMS) since this is the cheapest service available. Some of the youth even use laptops.

The eleven unemployed youth in the last FGD ranged in age from 16-21, and were mostly young men. Four had graduated high school, one had dropped out of high school, four had graduated junior high school and two had dropped out before completing junior high school. Two of those

without any high school education had worked in factories in Gombong (by showing up at the factory and inquiring about job openings) and Bandung (through information acquired from a friend) but only for a few months. Three of those who had graduated SMK (vocational high school) had attained short-term job contracts at factories through their schools, including a young woman who worked in a garment factory. Three of the male youth had worked temporary construction jobs and as seasonal fishermen in the village and the other young woman in the group had produced garments at home. The other three did not yet have any work experience and continued to be supported by their parents, as were those who had worked occasionally in the village and those who had returned from short stints in factories. The youth who had worked outside of the village generally expressed a disliking for their work and hoped to find more interesting work with better salaries whereas those that had worked in the village felt that it was difficult to find stable employment in the village and some hoped that employment in the cities would be more consistent. For the most part, however, it appeared that the parents of these youth were still capable and willing to pay the living costs of their children who often helped their parents with the work of attending to livestock and farming, etc.

The youth listed the Department of *NakerTrans*, BKK (Vocational Center), and the Internet as resources for finding job information. A couple specifically noted that Facebook, and particularly Facebook pages for school alumni groups, sometimes provided job information. One young man who had graduated from a vocational high school explained that his friends from other towns had successfully obtained jobs through high school alumni Facebook pages. Another had looked for job information in the Kebumen newspaper, *Suara Merdeka Kebumen*, for openings in Central

Java. The other youth generally searched for job information through their friends and relatives, both those within and outside of the village.

All of the youth had their own mobile phones and many had contacted friends and relatives, particularly those living outside the village, through their mobile phones. All of them had also used Internet to some extent through either their mobile phones or *WarNets*. Most used their mobile phones on a daily basis to text, make calls and access Facebook. Some also used their mobile phones to listen to music. A few had received information about jobs in Bandung and Jakarta from their friends via text (SMS) and two had looked for jobs through Facebook. Most bought their airtime credit by texting a credit distributor in the village whom they would pay later. Often they would pay 10,000 rupiah (USD \$1) at a time, which generally lasted two days. Many also used two different SIM cards from two different MNOs in order to lower the cost of texting or calling their friends who may use different operators.

As with other groups, the youth also received fraudulent SMS texts from unknown numbers that often asked for airtime credit transfers. Some received these once per month, others weekly, and some received them daily. However, these texts did not make the youth distrust their mobile network operators but rather just the phone numbers that they received the texts from. They still trusted texts that they got from the MNO itself about getting additional free texts, for example. In fact, they said that they trusted the MNOs more than Facebook since Facebook was just for fun for chatting with friends that they already know. How this made Facebook less trustworthy was not entirely clear.

Lastly, the youth noted that the radio was rarely used these days because of difficulties in acquiring a radio signal. Even their parents had

largely replaced their radio usage with television, which could be used to watch soap operas, listen to music and hear the national news.

Despite the enthusiasm that the youth in the focus group showed for their mobile phones, an interview with a returned migrant worker showed that some youth still did not have their own mobile phones. Ahmad Zainurohman, 41, who originally came from another town had dropped out of high school and secured a local job as a salesman through *NakerTrans* for two years before moving to Malaysia for two years to work as a construction contractor—another job secured through *NakerTrans*. Following these two jobs he had settled down in the village of Pasir with his wife who is from the village and had begun working as a livestock inseminator. He has only had his own mobile phone for the past two years, which he acquired after moving to Pasir. He only uses his mobile phone for work so that villagers can reach him easily when they want their cows to be artificially inseminated. His children, aged 8 and 14, do not have their own mobile phones but will sometimes borrow his in order to play games on it. He also gets daily spam text messages on his mobile phone but always deletes them immediately and never responds to them. He is happy with his experience with *NakerTrans* and decided to use the government agency because he believed they were trustworthy even if it meant that he had to pay taxes that could have been avoided had he used informal means (PJTKI agents) to get work abroad. Ahmad is now happy with his work in Pasir and does not plan on searching for work elsewhere again.

Another resident of Pasir who used his mobile phone predominantly for work was a 33 year-old

fisherman named Yasmin. He had been a fisherman since he dropped out of the fifth grade and since that time new technologies had made fishing easier and safer. In addition to the introduction of motorboats making fishing safer, the mobile phone had also enabled the fisherman to exchange news with other fishermen about the quantity of fish in different parts of the ocean around Indonesia. In particular, his ability to talk to his relative in the Maluku islands over the mobile phone provided him with timely information that led him to leave Pasir on two occasions, in 2008 and 2010, to find more fish.⁵ Likewise, he was able to keep in touch with his family and fellow fishermen in Pasir to find out when the fishing output began to increase again there. Though fish were plentiful in Maluku year round, the income that Yasmin could gain by selling fish in Maluku was low due to transportation costs. However, the income was much more stable than the incomes in Pasir during the low season when the Eastern winds blew in and an adequate catch was not guaranteed.

This all would have been possible without the mobile phone but information would have taken much longer to exchange by mail and since fishing seasons can change after a few months the information about the fish may not have been as accurate by the time it reached the fisherman, especially since mail was often late. On his second trip to Maluku, 19 other villagers, having heard of his success, followed him. Now four still remain there and he keeps in touch with them through his mobile phone and continues to receive updates about the size of the catch and the income that they are able to make.

On a couple of occasions, prior to his trip to Maluku islands, Yasmin had acquired information

5 His primary reason for leaving for the Maluku islands on his first trip was to reunite another relative from Pasir with his mother who lived in Maluku, however the fishing output in Pasir was also bad at that time and he had heard that the amount of fish that could be caught in Maluku was greater.

about sea snails in the province of Yogyakarta and fish in the province of West Java from tradesmen to whom he sold fish in Pasir. The first of these leads turned out to be successful, while the later did not. However, overall Yasmin feels that it is relatively easy to acquire reliable information now. A large part of this, he believes, is due to the ease of getting timely and direct information that the mobile phone has enabled. For the past three years, most fishermen in Pasir have had their own mobile phones and use it to communicate with each other about the condition of the ocean/ quality of fishing catches in different parts of the ocean. Having a mobile phone also makes going further out to sea safer since one can now call for help if necessary.

Yasmin uses his mobile phone predominantly to make and receive calls. He rarely uses SMS texts and has never used the Internet. He also felt that it was unlikely that any of the other fishermen in Pasir had used the Internet either. He did mention, however, that fishermen from Sulawesi whom he had met in Maluku used expensive GPRS devices that helped them detect large fish in deep waters. For them the device was necessary to be successful in Sulawesi. If the device were cheaper Yasmin would buy one as well. However, for him the cost is not worth it since he is able to catch enough fish without it.

Another Pasir fisherman, 26 year-old Sukardi, is also the head of the village's chapter of the sub-district's Islamic youth group known as IPNU-IPPNU (the Men's Student Association for the Nahdlatul Ulama Muslim Organization). He has been the president of the chapter for the past five years. Member villages within the sub-district annually compete in sports such as volleyball and in other activities such as reciting Muslim poetry. Almost all of the members are between the ages of 15-30 and generally leave the group once they get married. The majority of them are

still in school (ages 15-20). The rest (among the men) are mostly fishermen. Sukardi guessed that about 50% of the men left the villages in search of work after finishing school, while the other 50% became fishermen and stayed in the IPNU-IPPNU group. He believed that more women, about 80%, left the villages after finishing school in search of work and thus there were fewer women members. Most of the men and women were about 18 or 19 years old when they finished school and would leave the village for about two years before coming back and then sometimes leaving again. Often job information is acquired through phone calls with friends.

Sukardi explained that most members had a mobile phone and that this was how information about meetings was conveyed. He believed that mobile phone usage had been relatively widespread among members for the past 3-4 years. He did not, however, know about whether IPNU-IPPNU group members had Internet access.

In the village of Pasir, IPNU-IPPNU is a part of a larger body called *Karang Taruna*. Though every village in Indonesia is technically meant to have one of these youth groups, many are inactive. The heads of the villages of Langse and Karanggadung both explained that their *Karang Taruna* groups were inactive due to the fact that most youth were working outside of the villages. The *Karang Taruna* in Pasir, however, is very active and particularly well known for its volleyball team, which has won competitions with other *Karang Taruna* volleyball teams at the provincial level. The head of the Pasir *Karang Taruna*, who claims responsibility for making the organization significantly more active six years ago, is a 50 year-old junior high school teacher named Sudarso. Aside from volleyball, other activities that Sudarso has initiated are drug and alcohol education activities, rock climbing, rowing, and bands.



In contrast to the statements made by the head of IPNU-IPPNU, Sudarso believed that very few villagers left Pasir for work (less than 10%) because jobs as fishermen were plentiful. He believed that those who did leave the village mostly did so to continue school. For many villagers, a junior high school education was enough and he believed that most junior high graduates who did not continue school became fishermen. He believed that among *Karang Taruna* members, 50% would become fishermen. He guessed that about 60% of the current *Karang Taruna* members, particularly the men, already worked and that many of the women were married homemakers. He also believed that in general, men were more likely to own a mobile phone than women, though his own wife had her own mobile phone.

As a junior high school teacher, Sudarso also saw that most children by the age of 14 now already had mobile phones that they brought with them to school. In his opinion, this was not a constructive trend since the children would be busy texting and checking Facebook instead of paying attention to their lessons in class. He noted that those who did not use mobile phones were smarter and did better in class because they were

more focused. When used properly, however, he believed that mobile phones were a good tool for helping relatives keep in touch with each other.

At the same time, other ideas for the productive use of new technology in the village of Pasir have also come up. One member of the village government, Romelan, was particularly interested in how the Internet might help with the village's current infrastructure projects including a mosque and a new elementary school building. His son, who had left the village for further schooling, had told his father that designs for such buildings could be acquired from the Internet. Romelan had also heard that in the neighboring village of Karangbolong, a design from the Internet was used to build a mosque. Generally, the village of Pasir receives its infrastructure designs from high school students studying in the major cities of the district: Kebumen and Gombong. However, he is concerned that these student designs being general in nature do not take into account issues specific to Pasir, namely the coastal and mountainous terrain and the risk of being hit by a tsunami.

Romelan further explained that since Pasir's primary school was ranked first in the district

Figure 12: Census Question on Internet Access

20. a. Apakah pernah mengakses internet dalam 3 bulan terakhir?			<input type="checkbox"/>
1. Ya 2. Tidak ➔ [R.21]			
b. Lokasi/media untuk mengakses internet [Isikan kode 1 bila ya, kode 2 bila tidak]			
1. Rumah	<input type="checkbox"/>	3. Kantor	<input type="checkbox"/>
2. Warnet	<input type="checkbox"/>	4. Sekolah	<input type="checkbox"/>
		5. HP	<input type="checkbox"/>
		6. Lainnya	<input type="checkbox"/>
(mis : Modem portable)			

(Source: BPS Susenas 2010)

of Kebumen but did not have enough space to accommodate all of its students, the national government had allocated money to the village to build a new one-floor building. However, the village wanted to build a two-floor building. The government said that the village had to find a new design that already included two floors if they wanted to construct such a building since it would not be structurally sound to simply add an extra floor on top of the one-floor building design that the government had provided. For this reason, Romelan hoped to make use of the Internet to find such a design though he himself has had limited experience using the Internet before and was unsure of how to start that process.

As in Karanggadung, a survey was also conducted in the village of Pasir. Interestingly, Pasir also happened to be one of the villages surveyed by BPS in July 2010 and notably at that time only one respondent out of 63 answered yes to having Internet access through her mobile phone. Of those 63, twenty fell into the 15-30-age range, including the one respondent who answered yes to accessing Internet through her mobile phone. This lack of mobile Internet usage seems peculiar since at least 39% of the author's respondents aged

15-30 in the sampled neighborhood unit of Pasir used mobile Internet.⁶ However, one of the village government members noted that Internet access through mobile phones only began to become easily accessible through mobile phones in Pasir in the year 2010. It may be possible that this Internet access only began to become widespread after the survey had been conducted, later in the year. Additionally, due to the structure of the survey it may be possible that respondents who used Facebook through their mobile phones did not immediately think that this meant that they had used Internet in the past three months. As can be seen in Figure 12 above, respondents were first asked if they had accessed Internet within the past 3 months and only those who responded "yes" were then asked if they accessed Internet through a HP (mobile phone).

Of the 83 total respondents from Karanggadung and Pasir, 38 (46%) were currently looking for work and 45 (54%) had previous work experience. Among those with previous work experience, the majority had found jobs through friends or relatives though a few had used agents to get babysitting and housekeeping jobs while some high school graduates had found factory work through their schools.

Table 6: Sources of Job Information among Survey Respondents in Karanggadung and Pasir

	Option	Checked (%)
A	<i>Dari Saudara (From a Relative)</i>	19 (42)
B	<i>Dari Teman (From a Friend)</i>	25 (56)
C	<i>Dari perusahaan (From a Business)</i>	4 (9)
D	<i>Dari Agen (From an Agent)</i>	4 (9)
E	<i>Dari NakerTrans/ Pemerintah (From the Government)</i>	1 (2)

⁶ If the sample is confined to one neighborhood unit (RT), and thus likely more representative of the village as a whole, 12 out of 31 respondents (39%) accessed the Internet through a mobile phone. This can be considered relatively comparable with the survey sample used by BPS in July 2010, which was also constrained to one neighborhood unit (RT) in Pasir, albeit a different one. Out of the author's total sample of 49 respondents in Pasir, 26 (53%) used mobile Internet, but these included the children of village government officers and FGD participants.

	Option	Checked (%)
F	<i>Dari boss pekerjaan lain (From a previous boss)</i>	0 (0)
G	<i>Membuat pekerjaan sendiri (Self-employed)</i>	0 (0)
H	<i>Dari Koran (From a Newspaper)</i>	0 (0)
I	<i>Dari Internet (From the Internet)</i>	1 (2)
J	<i>Dari Selebaran (From a Flyer)</i>	2 (4)
K	<i>Lain-lain (kebanyakan lewat sekolah) (Other)</i>	9 (20)
Total	Yang Sudah Pernah Bekerja (Have already worked)	45 (100%)

(Source: Survey conducted by Author)

Outside of the village, the most popular work destination among those who had work experience was Bandung, where 16 (36%) of respondents with work experience having worked there. Not surprisingly, the other popular work destination was Jakarta with 12 (27%) having worked there. Only 2 respondents (5% of those with work experience) had ever worked outside of the country. Anecdotal evidence seemed to show that a larger number of older village residents had worked outside of the country, particularly older women who had worked as *pembantu* in countries such as Malaysia. The lack of survey respondents with international experience may be a result of young international migrants not yet having returned home or it may represent a shift in migrant jobs away from international migration and towards the cities on Java/ in Indonesia. A more thorough survey, with a larger sample and age-range, would be needed to clarify whether this is in fact a trend in Kebumen.

6.3. Concluding Thoughts from the Kebumen Case Study

The research findings from Kebumen show that young people, particularly those in junior high and

high school, are becoming increasingly active in their use of mobile phones and social media enabled through their mobile phones. For the majority of villagers, however, SMS texts and calls via mobile phones used to keep in touch with friends and family and sometimes assist with work were the most popular uses of ICTs. For those searching for work outside the village, mobile phones have made receiving relevant information from friends and family easier. However, among high school aged youth, some have begun to look into ways of using social media and the Internet not only for entertainment but also to look for job information. While the interest is there, most young people with mobile Internet access appear to be not quite yet sure as to how best to utilize it.

On the local level, the district *NakerTrans* office may be able to make use of this information in shaping better programs for providing accurate and timely job information to interested young people in Kebumen district. For example, information posted at the main office in the city of Kebumen could also be shared through a Kebumen *NakerTrans* Facebook page. Though the Kebumen BAPPEDA office does have a website with news updates, this is likely not easily found or navigable

Table 7: Locations where Karanggadung and Pasir Survey Respondents Have Worked

	Option	Checked (%)
A	<i>Desa Ini (This Village)</i>	25 (57)
B	<i>Desa Lain di Kab Kebumen (Another Village in the District)</i>	9 (20)
C	<i>Kota Kebumen (Kebumen City)</i>	2 (5)
D	Jakarta	12 (27)
E	Bandung	16 (36)
F	Jogjakarta	2 (5)
G	Semerang	1 (2)
H	Surabaya	0 (0)
I	<i>Kota Lain di Jawa (Another City in Java)</i>	6 (14)
J	<i>Di Luar Pulau Jawa (An Indonesian Island other than Java)</i>	3 (7)
K	<i>Di Luar Negara (Outside of the Country)</i>	2 (5)
Total	Yang Sudah Pernah Bekerja (Have already worked)	45 (100%)

(Source: Survey conducted by Author)

by the young people most often using the Internet through Facebook. Moreover, just as *NakerTrans* has set up workshops to help villagers learn new skills that can be used to develop home industries, the district government or high schools might also consider providing workshops or classes that teach interested villagers about how to access relevant information on the Internet (various website and search resources, etc.). Eventually, other districts in Central Java, and possibly other parts of Indonesia, may find it useful to follow these steps as well if similar trends exist in mobile Internet usage uptake among young people in those areas.

Lastly, in terms of migrant workers, the local government could benefit in their understanding of these groups and their needs by ensuring that

village heads include migration data in the village profiles that they update annually. However, resources such as trainings in home industry skills should also be maintained (an example of this came from a story from a *Pengajian* member in Pasir who noted that a *NakerTrans* workshop had assisted her in learning how to make and sell snacks out of leftover fish parts). Though migrant work may provide some relief for unemployment in villages that are resource poor, more should be done to enhance the capability of villagers to make a stable income within their own villages. In areas where farming is difficult because of the poor quality of land, perhaps systems could be built to help with irrigation and/or workshops could be initiated to provide information on more productive farming techniques.

VII.

Major Implications for Development Practitioners and ICT4D in Indonesia

7.1. Trust and Community

The findings from the literature review, ICT4D program case studies and fieldwork in Kebumen have important implications for how the concept of ICT4D can most effectively be put to use and the role that NGOs and government agencies can or should play in this. One theme of particular importance is that of trust and the link between trust and community. This was particularly clear in Kebumen, but also came up often in examples from the other ICT4D case studies.

An old and well-known Javanese saying, “*mangan ora mangan asal kumpul*,” states that coming together as a community is necessary even when one is worried about finding enough food to eat. Though this saying was initially also used to imply that people should not leave the village even to find food, villagers have come to accept the increase in migration for work over time. The means by which mobile phones and social media now enable more villagers to stay in touch with their families and communities certainly seems to play a role in this. However, the emphasis on community staying together continues to be strong in Javanese and

other Indonesian cultures.

Examples of the strong link between trust and community can be seen in the district of Kebumen through the use of the locally operated *travel* shuttles used by migrant workers from Langse; the desire of the Karangadung Facebook page creators to ensure that the Facebook page settings were private and membership was limited to those who were verified as being from Karangadung; the trust that the returned migrant worker in Pasir had for the local *NakerTrans* office over the PJTKI agents that often came from outside of the district; the general consensus among villagers that the most trustworthy way of finding accurate job information and avoiding scams was to receive information from friends, neighbors or family (whether in person, by phone call or by text message); and by the hesitation on the part of the Kebumen office in charge of disaster preparedness and relief to input the phone numbers of village heads into the alert system because they believed that SMS texts would be disregarded as spam.

These findings resonate with the experience of the rural bank in Bali that tried to give mobile phones to MFI clients and found that the clients did not trust them. In this case, the solution was to have

the MFI agents, with whom the clients already had an established relationship, show by example how the mobile phones could be used to make financial transactions. The Grameen Foundation also has shown their understanding of this need for utilizing local relationships with their idea of selling their job information application through local *warung* airtime sellers. Other development practioners interested in developing ICT4D tools must keep these ideas in mind when planning how best to reach target clients and provide services that are considered trust worthy. Specifically, development practioners would do well to have a local partner that is trusted in the target community and that is willing to introduce the ICT4D initiative.

Lastly, development practioners should remember that because of the large amounts of spam delivered to mobile phones and the scam and ensuing legal issues surrounding this in Indonesia, most Indonesians are very wary of receiving information from any mobile phone number that is unknown to them. As such, this will likely create a challenge for those attempting to use SMS based services, particularly if money is involved.

7.2. Promising Areas for ICT4D Use

Largely because of issues of trust, some ICT4D services are likely to be more difficult to implement than others. In particular, mobile banking and job information services that utilize text messages are more likely to be distrusted since spam messages that provide misleading or false information are often about money or job openings. More promising areas for ICT4D seem to be in areas of information sharing, or more specifically the efficient provision of relevant and timely information needed by specific marginalized groups. Situations in which attaining information on a timely basis is of clear importance include disaster

alerts and relief, maternal health and market prices for commodities being sold by farmers.

The second is that certain ICT4D services, such as information provision, are more likely to be successful than others, such as mobile banking, which have significant regulation barriers to face and which inherently involve significant issues of trust. Organizations that attempt to increase access to information for the more broad purpose of providing those with limited access to information with more resources also appear to be beneficial and allows for the recipients to take greater control of how they decide to use their improved access to information to suit their needs. Specifically, Air Putih Foundation appears to be doing this by attempting to build better infrastructure for Internet in areas where this infrastructure has been destroyed or is otherwise insufficient. In all likelihood, even without ICT4D programs, Indonesians will continue to find their own innovative uses of mobile phones and Internet as these technologies become more accessible due to market forces. In these cases, lessons in Internet literacy for the general public might be the most useful thing that NGOs working in ICT4D can provide.

For programs that do not rely on market forces, however, there is also the issue of sustainability. Most of the ICT4D initiatives profiled rely on funding from non-profit organizations or are funded through corporate responsibility programs. Finding a balance between charging for ICT4D services without making them unaffordable will be a hard balance to strike and yet it is necessary if these programs are to sustain themselves.

Another promising area within ICT4D to consider now is the rapid uptake of social media through even many of the cheaper models of mobile phones. Facebook in particular has

clearly found a large market in Indonesia and young people even in rural areas (at least in Java) are accessing social media networks on their mobile phones—some even before using any other type of Internet. As such, ICT4D does not have to be limited to SMS based programs but may also be able to utilize social media, such as Facebook, to provide access to information to target groups (at least among youth). Some Indonesian organizations have already realized the power of social media, both in terms of facilitating cyber activism and now also for providing disaster relief alerts as Jalin Merapi has done through Twitter.

At the same time, the extent to which Indonesians trust social media more or less than MNOs is not yet clear and responses thus far appear to have been mixed. Perhaps the best response then is to use both mediums simultaneously when possible. This follows Samarajiva and Waidyanatha's reasoning (in Sri Lanka) that a combination of SMS messaging and a robust website are key factors in successfully using ICTs to enable cooperation between disaster relief agents. This paper argues, however, that social media may now be surpassing websites as an effective means for reaching young Indonesians. Moreover, the combination of mobile phone and Internet services may be useful in providing other types of information and not only for coordination between disaster relief agents. Lastly, it may be worth asking what the consequences of the popular notion that Facebook is the Internet will have in the future for the younger generation of Indonesians. How will this shape their use of the Internet? What opportunities and what challenges will this create? These are questions that the developers of ICT4D tools will have to consider.

7.3. ICTs as Tools vs. Solutions for Development

In considering the findings from this paper and the opportunities presented, development practitioners must not forget that ICT tools in themselves are not solutions to development issues. Instead, they should be seen as potentially suitable methods for facilitating more effective and efficient services for well thought out development programs. In other words, ICTs may provide a great way for spreading information, but that information must still be accurate and relevant to the recipients being targeted. Moreover, almost always, information is important but not a solution in itself. Often, more than information is needed.

As PUPUK Bandung found, for example, market price information was helpful for farmers, but they also needed lessons on how to improve their farming techniques. Specifically, having an agriculture expert show them how to increase the quality of their patchouli oil by using different containers helped them fetch higher prices at the market. The same is true for ICT4D applications attempting to provide information on job openings. While this information may be useful and help connect employees with employers, other issues such as labor policies, agricultural policies and broader economic policies must be addressed so that employers have enough jobs to offer.

Moreover, the extent to which ICT4D tools can be made use of in Indonesia is still largely limited by the current telecommunications infrastructure available. Specifically, while ICT4D tools may work in Java and Bali, much of the rest of Indonesia may still not be able to benefit from these tools because MNO signals are often weak and Internet access is still far from being prevalent. In addition to enabling more widespread use of ICT4D tools,

better telecommunication infrastructure outside of the major hubs could also act as a means for enticing young Indonesians to stay in their villages. As Ben White argued, if more youth had access to mobile phones and social media at home they may be less likely to feel that they have to leave home to find modernity.

In addition to supporting the building of more telecommunication towers, the Indonesian government should continue to support the development of open source software such as that

used by PUPUK Bandung. These resources also need to be adequately advertised to NGOs and CBOs throughout the country that might be able to make use of them in their own communities.

Lastly, while ICTs provide a large potential for enhancing development work, technological development has also been blamed for creating “jobless growth.” As such, in developing ICT4D tools, development practioners should make sure that their use of ICTs is not in anyway creating a backlash against employment.

IX.

Conclusion and Areas in Need of Future Research

This paper has provided a preliminary overview of the state of ICT4D in Indonesia, by giving examples of the range of ways in which ICTs have been used to assist with various development programs and also by showing how people in rural areas of Kebumen District, Central Java make use of their mobile phones and growing access to Internet. Opportunities clearly exist for improving current ICT4D programs and building effective new ones in Indonesia, including the use of increasingly popular social media sites. However, challenges—particularly those relating to gaining the trust of target beneficiaries and ensuring that programs are sustainable—remain significant. International and domestic NGOs may have to partner with government agencies and/or MNOs to create effective programs. At the same time, development practitioners must not lose sight of the needs of target beneficiaries and their comfort with ICT enabled programs. As such, the most important partnerships remain those developed with community members and people working on the ground. No matter what type of ICT4D program is being initiated, relevant local groups should be consulted and local partners should be established in order to ensure that projects are understood and trusted by the beneficiaries.

Additionally, the more recent rapid growth of social media increasingly being accessed by affordable mobile phones is a trend that should not be ignored. As the private sector continues to invest in developing more variations of affordable technology, the non-profit and government sectors hoping to develop ICT4D tools must keep up and recognize which types of technology are most likely to be used by which demographic groups in Indonesia. At the same time, it must be recognized that while MNOs are interested in reaching lower income markets, market forces alone are not enough to ensure that access to technology is adequately spread out across the archipelago. As such, policies that encourage development of telecommunications infrastructure outside of Java and Bali are vital. Likewise, the development and disbursement of Indonesian open source software and trainings in technology literacy can help NGOs and CBOs provide useful services to target communities through ICTs. Lastly, despite all the opportunities that ICTs provide—they remain first and foremost a means for providing access to needed information and services and are not in themselves solutions to issues of poverty, poor health, unemployment or marginalization.

This paper has begun an assessment of the current state of ICT4D in Indonesia and some opportunities and challenges that exist as ICT access becomes more widespread throughout Indonesia. However, since the results of this research are largely anecdotal and make use of a relatively small population sample, more extensive and more systematic research must be done to confirm these preliminary findings.

Perhaps more importantly, more ICT4D initiatives should follow the Midwives Mobile Phone project's example by evaluating the effectiveness of their programs in attaining the original goals and reaching the target beneficiaries. In order for this to be possible, donor agencies need to show that they value rigorous evaluations by providing

the necessary funding to ICT4D projects that they support.

While this paper focuses predominantly on Indonesians living and working in Indonesia (including rural-urban migrant workers), it may be useful to conduct research on how social media based applications are or may potentially be used by international migrant workers. As this paper has shown that international migrant workers use Facebook as a cheaper alternative to texting to keep in touch with family and friends in Indonesia, social media may eventually serve as a means for providing access to other forms of information and services beneficial to international migrant workers as well.



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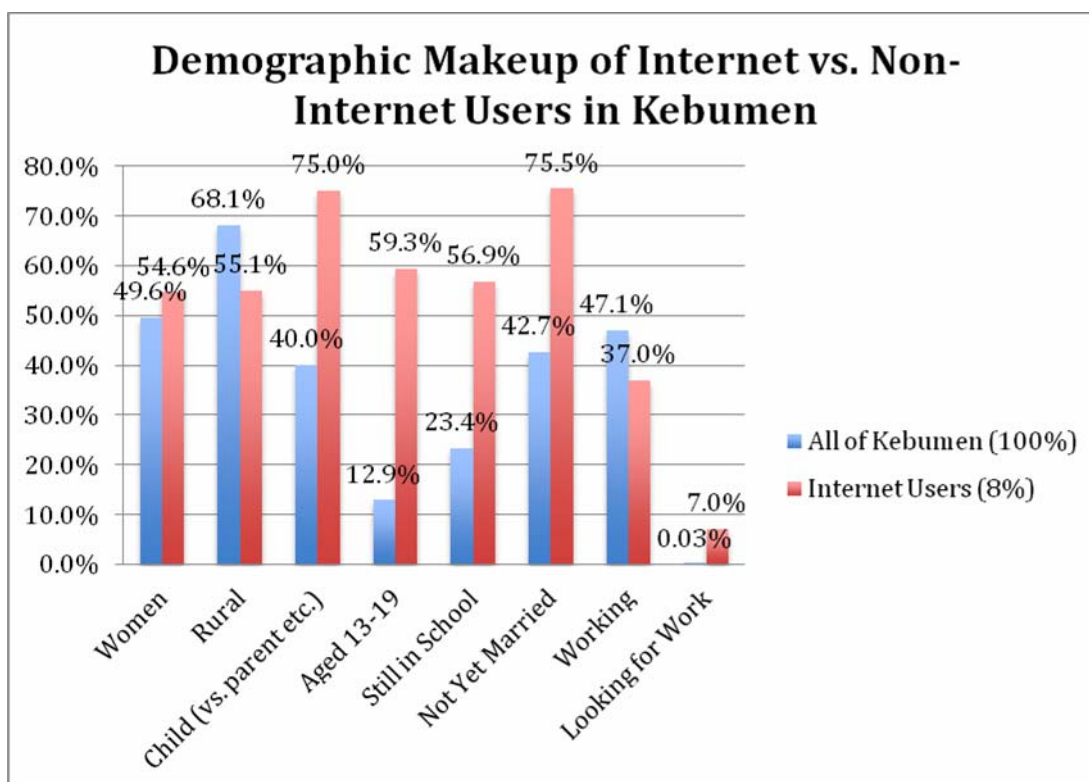
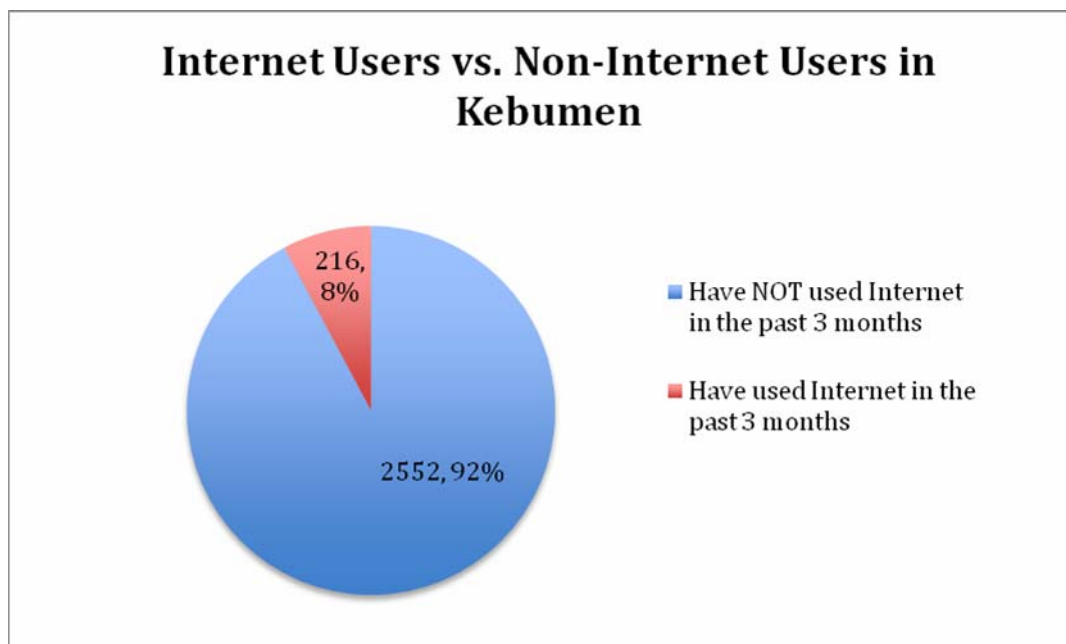
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Appendix A: Internet Usage in Kebumen District



(Source: BPS Susenas 2010)

Appendix B: EpiSurveyor Survey used in Karanggadung and Pasir (English Translation)

1. Date
2. Name of the village
3. Code Number for the Neighborhood
4. Respondent's Name
5. [Respondent's] Age
6. [Respondent's] Gender
7. [Respondent's] Education Level
8. Do you have your own mobile phone?
9. Do you have Internet access via your phone?
10. Do you access Internet in any other way (WarNet)?
11. Are you currently looking for work?
12. Do you have a specific skill/ability? (Tailor, Electronics, Automotive, Carpenter, etc.)
13. What types of jobs have you already held?
14. Where have you worked?
15. For how long have you been working?
16. Using what methods have you acquired job information?
17. Are you interested in job information from AKATIGA [if there is any]?
18. [If so, what is your] phone number?
19. [and/or what is your] Facebook name?



(Image produced by EpiSurveyor.com as a preview for testing the application)